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FM 7-24

MENT OF THE ARMY FIELD MANUAL

COMMUNICATION IN INFANTRY AIRBORNE DIVISIONS

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DEPARTMENT OF THE ARMY FIELD MANUAL
FM 7-24

This field manual supersedes FM 7-24, 6 December 1944, including C 1, 11 July 1946

COMMUNICATION
IN
INFANTRY
AND
AIRBORNE
DIVISIONS



DEPARTMENT OF THE ARMY

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OFFICIAL:

EDWARD F. WITSELL
Major General, USA
The Adjutant General

J. LAWTON COLLINS

Chief of Staff
United States Army

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CONTENTS

CHAPTER 1. GENERAL	<i>Paragraph</i>	<i>Page</i>
<i>Section I.</i> General.....	1-13	1
II. Orders and instructions affecting communication.....	14-17	11
III. Command posts.....	18-25	15
IV. Means of communication.....	26-32	22
V. Communication security.....	33-36	34
VI. Communication training.....	37-39	38
CHAPTER 2. SIGNAL COMPANY, INFANTRY DIVISION		
<i>Section I.</i> Organization.....	40-45	40
II. Communication during a concentration.....	46-49	49
III. Communication during marches and halts.....	50-60	54
IV. Communication during development.....	61-63	18
V. Communication during the attack.....	64-68	72
VI. Communication during reorganization.....	69-72	77
VII. Communication during pursuit.....	73-75	79
VIII. Communication during defense.....	76-80	82
IX. Communication during retrograde movements.....	81-82	88
CHAPTER 3. SIGNAL COMPANY, AIRBORNE DIVISION		
<i>Section I.</i> General.....	83-85	92
II. Communication during marshalling and air movement..	86-87	95
III. Communication during assault..	88-94	96

CHAPTER 3—Continued	<i>Paragraph</i>	<i>Page</i>
<i>Section IV.</i> Communication during sustained combat and at base camps.....	95-96	101
V. Signal supply.....	97-98	102
CHAPTER 4. DIVISION ARTILLERY		
<i>Section I.</i> General.....	99-103	104
II. Communication during a concentration.....	104-105	122
III. Communication during marches and halts.....	106-107	123
IV. Communication during the attack, reorganization, and pursuit.....	108-113	124
V. Communication during defense.....	114-115	128
VI. Communication during retrograde movements.....	116-118	129
VII. Airborne operations.....	119-120	130
VIII. Communication in support of armored units.....	121-123	140
CHAPTER 5. INFANTRY REGIMENT		
<i>Section I.</i> General.....	124-127	142
II. Communication during a concentration.....	128-129	145
III. Communication during marches and halts.....	130-131	146
IV. Communication during the approach march and in assembly areas.....	132-133	149
V. Communication during the attack, reorganization, and pursuit.....	134-142	151
VI. Communication during defense and reliefs.....	143-149	175
VII. Communication during retrograde movements.....	150-151	183
VIII. Communication with attached and supporting units.....	152-155	187

CHAPTER 6. AIRBORNE INFANTRY REGIMENT	<i>Paragraph</i>	<i>Page</i>
<i>Section I.</i> General.....	156-159	193
<i>II.</i> Communication during airborne operations.....	160-161	199
CHAPTER 7. ENGINEER COMBAT BATTALION, INFANTRY DIVISION		
<i>Section I.</i> General.....	162-167	204
<i>II.</i> Tactical application of communication.....	168-177	210
CHAPTER 8. ENGINEER BATTALION, AIRBORNE DIVISION.....	178-180	215
9. RECONNAISSANCE COMPANY		
<i>Section I.</i> General.....	181-186	218
<i>II.</i> Tactical application of communication.....	187-190	223
CHAPTER 10. TANK BATTALION		
<i>Section I.</i> General.....	191-196	226
<i>II.</i> Command posts.....	197-200	228
<i>III.</i> Tactical application of communication.....	201-206	233
CHAPTER 11. MEDICAL BATTALION		
<i>Section I.</i> General.....	207-209	243
<i>II.</i> Tactical application of communication.....	210-213	245
CHAPTER 12. COMMUNICATION IN SPECIAL OPERATIONS.....	214-225	248
APPENDIX I. REFERENCES.....		266
II. CHARACTERISTICS OF RADIO SETS IN THE INFANTRY AND AIRBORNE INFANTRY DIVISIONS.....		270
INDEX.....		174

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CHAPTER 1

GENERAL

Section I. GENERAL

1. PURPOSE AND SCOPE

This manual is a guide for the tactical employment of the personnel and equipment required to provide signal communication in infantry and airborne divisions. It describes the signal communication available to these divisions and tells how it is used in different types of tactical operations. Chapter 1 contains general information of interest to all units in infantry and airborne divisions. The term *signal communication* is abbreviated to *communication* in this manual, except where misunderstanding might result.

2. PERSONNEL

Each unit in the infantry and airborne divisions is provided with personnel whose primary duties are to install, operate, and maintain communication systems. Others concerned with communication include commanders and their staffs, those who operate signal equipment for which no communication personnel

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are provided (such as tank crews), and anyone else who is designated and trained to assist or take the place of communication personnel. For details on this communication personnel, see appropriate tables of organization and equipment.

3. ORGANIZATION OF TEAMS

Communication personnel are organized into teams. Considerations influencing the number of teams formed and team organization include the task to be performed; the availability of personnel, equipment, and transportation; and requirements for future tasks, including provisions for continuous operation. The nature of the teams' work demands a flexible team organization. Men are trained in more than one speciality to facilitate formation of teams for installing, operating, and maintaining communication systems, and to increase team proficiency.

4. EQUIPMENT, SUPPLIES, AND TRANSPORTATION

a. Tables of organization and equipment list the major items of signal equipment and transportation authorized for each unit. Expendable supplies are listed in signal supply catalogs. When a unit is assigned a special mission requiring more than authorized allowances, additional supplies are requested from higher commanders.

b. Equipment authorized or available to similar units may vary; particularly during transition periods when new equipment is being procured. To present a guide for the employment of various types

of standardized radio sets, the type radio nets shown for the airborne division and those shown for infantry division portray the use of different type sets where applicable (except in the tank battalion (ch. 10) where two types of equipment are portrayed for both infantry and airborne infantry divisions).

5. RESPONSIBILITY FOR COMMUNICATION

a. Each commander is responsible for the installation, operation, and maintenance of his unit's communication system and for its efficient functioning as a part of the next higher unit's communication system. Each commander exercises tactical and technical supervision over the communication systems of all units of his command.

b. The installation and maintenance of communication between units is governed by the following general rules:

- (1) The higher unit is responsible for establishing and maintaining communication with the lower (including attached) unit.
- (2) A unit supporting another unit by fire is responsible for establishing and maintaining communication with the supported unit. A unit supporting another unit other than by fire contacts the supported unit and coordinates communication.
- (3) Lateral communication between adjacent units is established and maintained as directed by the next higher common commander. In the absence of specific instructions, the commander of the unit on

the left is responsible for establishing and maintaining communication with the unit on his right.

c. Although one unit is specifically charged with establishing and maintaining communication with another unit, it is only through the joint effort of all concerned that communication is assured. If communication is lost, all affected units seek its immediate re-establishment.

6. STAFF COORDINATION ON MATTERS AFFECTING COMMUNICATION

Staff coordination on communication matters is outlined in the unit standing operating procedure (SOP) pertaining to communication. The provisions of standing operating procedures may vary in different organizations, but all SOP's usually prescribe that—

a. The *adjutant* (*G-1* or *S-1*) or headquarters commandant and the signal (communication) officer select the exact site and decide upon the interior arrangement of the command post. The adjutant or headquarters commandant directs the placing of signs and guides to indicate the location of the command post. The headquarters commandant is responsible for the displacement of the command post under the supervision of the adjutant. The adjutant sees that a summary of each message (including those not sent through the message center) is entered in the unit journal.

b. The *intelligence officer* (*G-2* or *S-2*) informs the signal (communication) officer of special security

measures and arranges for communication with observation posts and other intelligence elements. He supervises the collection of information having signal intelligence value, and he supervises the signal (communication) officer in preparing cryptographic items, authorized by higher authority, to insure their adequacy from the communication security viewpoint. He procures maps for communication units.

c. The operations and training officer (G-3 or S-3) and the signal (communication) officer coordinate communication with tactical operations. The G-3 (S-3) gives the signal (communication) officer timely information relative to contemplated operations and displacement of the command post. The signal (communication) officer submits his recommendations for paragraph 5 of operation orders to the G-3 (S-3) for the commander's approval. The G-3 (S-3) supervises the signal (communication) officer in preparing cryptographic items, authorized by higher authority, to make sure that they meet operational and training requirements. The G-3 (S-3) establishes priorities for the installation and use of the means of communication. He also authenticates signal orders, annexes, and instructions.

d. The supply officer (G-4 or S-4) arranges for communication with supply installations and sees that communication vehicles have the necessary road priority. He is responsible, in collaboration with the signal (communication) officer, for procuring and issuing signal equipment and supplies, and for collecting and disposing of salvage and captured signal equipment.

e. The *headquarters commandant* is responsible for the security of the command post and for the movement of command post impedimenta. He maintains order and enforces traffic and camouflage discipline in the command post area.

7. DUTIES OF THE DIVISION SIGNAL OFFICER

The division signal officer (DSO), as a member of the division special staff, is the technical adviser to the division commander and staff on all matters pertaining to communication and the location of command posts. He is assisted by the division signal officer's section of the signal company. Duties of the division signal officer (normally directed by the division commander) include—

a. Planning and supervising installation, operation, and maintenance of communication.

b. Supervising communication training throughout the division, including communication schools.

c. Directing the tactical employment of the division signal troops.

d. Planning, supervising, and coordinating signal supply, including maintenance and repair of signal equipment.

e. Maintaining communication security and assisting in all signal intelligence matters within the division (coordinates with assistant chief of staff, G-2).

f. Preparing for the division commander's approval—paragraph 5 of division operation orders, the communication section of the division standing operating procedure (SOP), the division signal

operation instructions (SOI), and the division standing signal instructions (SSI).

g. Recommending the procurement of communication personnel and communication units.

h. Establishing and maintaining a division signal supply point.

8. DUTIES OF THE COMMUNICATION OFFICER

The duties of the communication officer generally are the same, within his unit, as those performed by the division signal officer. The communication officer bases his actions upon the policies of his commander and the division standing operating procedure. He keeps himself fully informed of present and contemplated activities of his unit. A communication officer's principal duties include—

a. Advising the commander and staff on communication matters and making plans and recommendations for establishing the communication system.

b. Supervising the installation, operation, and maintenance of the communication system.

c. Coordinating communication with higher, adjacent, supporting, supported, and attached units.

d. Preparing plans for displacement or extension of the existing communication system.

e. Submitting recommendations relative to procurement and replacement of communication personnel.

f. Supervising the care, maintenance, and repair of signal equipment.

g. Supervising the maintenance of communication security—including the employment of codes, ciphers, and authentication systems.

h. Submitting recommendations for paragraph 5 of operation orders, including initial and subsequent command post locations.

i. Assisting in the preparation of training directives pertaining to communication, and supervising the technical training of all communication personnel and others designated by the commander.

j. Determining the requirements for signal equipment and supplies, and collaborating with the supply officer in their procurement and distribution.

k. Securing current signal operation instructions (SOI) and standing signal instructions (SSI) from higher headquarters and preparing extracts for use in his unit.

l. Preparing for the commander's approval—orders, cryptosystems authorized by higher authority, and standing operating procedure (SOP) needed to insure tactical and technical control of the communication system.

m. Assisting in selecting the exact location for the command post and selecting locations for communication installations within the command post.

9. DUTIES OF THE COMMUNICATION PLATOON LEADER

A communication platoon leader (also communication officer in some organizations) commands his unit and is responsible for the discipline, training, and control of his platoon. He is responsible for the installation, operation, and maintenance of the signal equipment issued to his platoon. He is the assistant communication officer (in organizations

authorized a communication officer in addition to a platoon leader) and in the absence of the communication officer assumes his duties.

10. TRAFFIC PRIORITY

Vehicles engaged in installing, operating, and maintaining communication systems and those carrying messengers are given a high road priority. The priority designation is made plainly visible to facilitate identification. Maintenance vehicles do not block roads unnecessarily. Other communication vehicles, including those carrying routine signal supplies, have no special traffic priority.

11. COMMUNICATION CENTER

A communication center is charged with the responsibility for the receipt, transmission, and delivery of official messages at a military headquarters or echelon of a headquarters. The communication center normally is composed of a message center section, a cryptographic section, and one or more means of communication.

12. MESSAGE CENTER

a. The message center at a headquarters is charged with the effective utilization of all available means of communication in the handling of all official messages except—

- (1) Those transmitted directly by the originator, using a means of communication provided for such use.

(2) Those handled by military or civil postal services.

(3) Local messages.

b. The size, duties, and composition of message centers vary with the number of personnel authorized by tables of organization and equipment or designated by the commander. In small units not authorized message center personnel, the commander, or a person designated by him, performs the duties of the message center. These duties include—

- (1) Coordinating the use of the available means of communication.
- (2) Maintaining current information on the effectiveness of each means of communication.
- (3) Selecting the means for the transmission of outgoing messages and determining their routing.
- (4) Observing the unit standing operating procedure in the handling of incoming messages.
- (5) Keeping temporary but reliable records to insure the prompt and accurate handling of messages.
- (6) Maintaining a continuous check on the flow of messages and reporting to the originator when a message cannot be delivered within a short time.
- (7) Observing security regulations in the handling of messages.
- (8) Maintaining current information on the location of unit command posts—with which

communication normally is maintained—
and the best routes to them.

(9) Keeping the official time.

13. MAINTENANCE AND REPAIR OF SIGNAL EQUIPMENT

Each unit maintains and repairs its signal equipment within the limits of its maintenance facilities, available parts, authorized tools and test equipment, and the capabilities of assigned repairmen. In units lower than division, these functions are termed *organizational maintenance*. *Field maintenance* is performed by the signal maintenance group of the division signal company. Signal equipment requiring repair beyond the capabilities of organic repair facilities is turned into a higher unit for repair. (Par. 42.)

Section II. ORDERS AND INSTRUCTIONS AFFECTING COMMUNICATION

14. SIGNAL OPERATION INSTRUCTIONS AND STANDING SIGNAL INSTRUCTIONS

a. Signal Operation Instructions (SOI) are a type of combat order issued for the technical control and coordination of communication within a command. They include items covering codes and ciphers, radio call signs and frequencies, telephone directory, and visual and sound signals. Current items are listed in the index to the SOI. The SOI of the division are prepared by the division signal officer for units in the division. They conform to the

SOI of the next higher unit. Normally, units smaller than a division do not prepare their own SOI. They prepare extracts of the division SOI. When authorized by higher headquarters, they prepare brevity codes, operation codes, map codes, and prearranged message codes.

b. Standing Signal Instructions (SSI), prepared by the division signal officer, may be issued in a separate publication or as a section of the SOI. SSI includes items of operational data not subject to frequent change and instructions for the use of the SOI.

15. STANDING OPERATING PROCEDURE

Standing operating procedure (SOP) pertaining to communication is prepared by the division signal officer for the approval of the division commander. Communication SOP's for other division units are based on the division SOP, and are prepared by unit communication officers for the approval of their commanders. The signal company SOP is prepared by the company commander for the approval of the division signal officer. Standing operating procedure is particularly applicable to signal (communication) units since many of their operations are the same regardless of the type of tactical operation.

16. PARAGRAPH FIVE OF AN OPERATION ORDER

a. Paragraph 5 of an operation order contains orders and instructions relative to communication and command posts. It is prepared by the signal (communication) officer for the commander's ap-

proval. For staff coordination, see paragraph 6. The contents of paragraph 5 vary with the size of the command, the use of standing operating procedure, and the situation. As a minimum, paragraph 5 contains the location of the initial command post of the issuing unit, or the place to which messages are to be sent. The establishment of wire and messenger service to initial command post locations is facilitated in certain situations when the next higher commander designates the command post locations for lower units. However, this is not done when there is doubt as to where a lower unit can establish its command post.

b. Paragraph 5 may be oral or written. Applicable portions of the following instructions are covered in the order indicated:

- (1) A reference to the signal annex or index to SOI in effect; restrictions, if any, on the use of any means of communication; visual and sound signals; and any other information not contained elsewhere in paragraph 5, such as lateral lines to be constructed.
- (2) The location of the command post of the unit issuing the order, the prescribed locations of command posts of lower units, and axes of signal communication. The time of opening of command posts may also be given. The information relative to command posts and axes of communication may be shown on an operation map or an operation overlay. In such cases it is only necessary to give a reference to the operation map or overlay.

- (3) The location and time of opening of an advance message center, march-control point, or other place to which messages may be sent.

17. ORAL ORDERS OF A COMMUNICATION OFFICER

A communication officer after obtaining approval of his communication plan issues oral orders to appropriate communication personnel. This practice expedites the establishment of communication. These orders may be supplemented by an operation map. Detailed orders for routine operations governed by SOP are not included (par. 65). A communication officer's oral orders include—

- a.* Information of enemy and friendly forces required for the efficient operation and security of the communication system.

- b.* Mission of the platoon.

- c.* Instructions to section chiefs may include any or all of the following:

- (1) Instructions to the message center chief concerning the location of the message center and messenger station; schedules and routes; use of codes and ciphers; location and routes to the command posts of subordinate, attached, supporting, adjacent, and next higher headquarters.

- (2) Instructions to the radio chief concerning the location of radio installations; operation instructions and schedules; employment of voice radios; location of panel-display,

message-drop, and message pick-up grounds; and restrictions, if any, on the use of radio and visual means of communication.

- (3) Instructions to the wire chief concerning the location of the switchboard; number and location of local telephones (including long locals, such as lines to the observation posts); use of sound-powered telephone equipment; number and routes of trunk lines; and special instructions applicable (may be clarified with a circuit diagram and a line-route map).

d. Administrative details including locations of the motor park, bivouac area, and division signal supply point.

Section III. COMMAND POSTS

18. GENERAL

The headquarters of a unit in the field is called the command post. When the headquarters is divided into a forward and a rear echelon, the forward echelon is the command post, and the rear echelon is primarily administrative. The command post consists of personnel and equipment required to furnish immediate assistance to the commander in tactical operations. Contact with the commander can always be secured at or through the command post. A commander frequently goes forward of the command post to observe and direct the action, but he maintains contact with the command post. All com-

munication facilities center at the command post, and each commander keeps higher, lower, and supporting units informed of the location of his command post. For command posts of armor units, see paragraphs 197-200.

19. SELECTION OF LOCATIONS

The signal (communication) officer, after staff coordination, recommends the command post locations (par. 6). His recommendations are based on the following factors, whose relative importance depends upon the situation:

a. Type of Tactical Operation. During movement to contact, the command post moves by bounds along a designated route, or it is located at a designated place in the formation. In offensive operations, the command post is located well forward to avoid early displacement. In defensive operations, the command post is located so local enemy penetrations will not cause displacement. In other types of tactical operations, the command post is located at the place from which the commander can most effectively control his unit.

b. Disposition of Troops and the Plan of Operation. A command post remote from its units places an unnecessary burden on the communication system, delays the transmission of orders and information, and makes tactical control difficult. The locations of the higher headquarters and the unit making the main effort influence the location of the command post.

c. Signal Communication Requirements. Com-

mand posts are located to facilitate signal communication. An improperly located command post may delay the establishment of communication at a critical time or make maintenance of effective communication impossible. The principal considerations for the location of the command post with respect to signal communication requirements are—

- (1) Effect of distance and terrain on wire and messenger communication.
- (2) Necessity for wire routes to the front and rear permitting prompt establishment of wire communication.
- (3) Effect of power lines, electrical stations, hill masses, dense woods, and distance on radio communication.
- (4) Dependency on suitable terrain for use of drop, pickup, and panel messages.
- (5) Necessity for line-of-sight locations, visible only to friendly troops, for use of visual communication.

d. Routes of Communication and Traffic Conditions. Since all communication facilities center at the command post, roads into and out of the OP and the traffic to be expected on these roads influence the selection of the command post location. Messengers, wire teams, command vehicles, and other control and supply vehicles constantly use the routes of communication from the command post forward to lower units and back to higher units. Absence of suitable routes of communication causes delays and makes tactical control difficult.

e. Space for Command Post Installations. The various installations within the command post are

given sufficient space to operate efficiently and to avoid unnecessary casualties due to enemy action. The minimum distance between installations outside of structures is 50 yards. Space is provided for other command posts that may be located in the vicinity and for liaison and agent personnel from other units. An alternate command post location in the general area may be necessary.

f. Cover, Concealment, and Security. In the selection of the command post location, consideration is given to the availability of natural concealment, cover, and defensive positions. The command post is located at least 200 yards from any landmark or terrain feature that is likely to attract hostile fire or air attack. A location that cannot be seen from main roads is preferable. For security reasons the command post may be located with a lower unit.

g. Proximity to Good Observation. In small units it is desirable to have an observation post close to the command post, which facilitates communication and the movement of both command posts and observation posts.

20. DESIGNATION, MARKING, AND TIME OF OPENING

The command post location is designated at some convenient landmark, such as a village or road junction which is easily identified on the map and on the ground. In terrain lacking easily recognized landmarks, a unit is usually directed to select and report the location of its command post. The exact site is selected in the general area of the designated point.

When shown on a map, the base of the flagstaff is placed at the designated location. The route leading from the designated location of the command post to the exact site is marked by signs or guides, or for security reasons only guides may be used. If signs are used, they are large enough to be seen and read from a rapidly moving vehicle. If the command post is in a town, the main roads leading into the town are marked, beginning at the entrance to the town. The message center places the necessary guides or signs to direct incoming messengers to the message center. The command post is opened at the time designated, or if no time is designated, as soon as practicable after the order is issued.

21. INTERIOR ARRANGEMENT

a. The *commander and his staff* are located to facilitate conferences and entrance to and exit from the command post. Each means of communication is considered and then located so that it best serves the commander and his staff.

b. The *message center* is located at the natural entrance to the command post so that incoming messengers may find it easily and outgoing motor messengers may be dispatched quickly. A messenger station is selected nearby. Motor vehicles used by messengers are located conveniently with respect to the message center and messenger station.

c. The *radio station* is located at the site that provides maximum efficiency in transmission and reception. Other considerations in selecting this site include convenience to the user (especially the message

center) ; location of the panel-display, message-drop, and message pick-up grounds; mutual interference between radio sets; and the possibility of radios being located by enemy direction-finding equipment. Sets used with remote control equipment may be located without regard to the user. Motor vehicles with radio sets installed are usually parked at the radio station.

d. The *panel-display, message-drop, and message pick-up grounds* are more convenient when their locations coincide. They should be near the radio station whose personnel are used for their operation. The ground selected should be level, open, free from high weeds and brush, and removed from bodies of water. The panel-display ground should be situated so that observers can read displays at wide angles from the vertical. Shadows are avoided where possible. Unobstructed approaches to the message pick-up ground are required, in order to pick up messages and so that this field may serve as an emergency landing strip for light aircraft.

e. The *switchboard* is installed in a location that is convenient to incoming wire circuits and free from noise and interference.

f. *Fire-direction centers* are located to provide cover and protection for the operating personnel. It is desirable that they be free from outside noises.

g. *Telephones* are installed according to the priority established in the unit SOP.

h. The *motor park* is established in a covered location accessible to vehicles and at a distance from the command post. It is located so that its detection from the air will not disclose the command post.

22. OPERATION

The command post is organized for 24-hour operation. During periods of little activity, all personnel take every opportunity to rest and prepare for more active periods. Duty personnel are rotated to insure that all have an opportunity to rest. Sufficient means of communication should always be available to transmit and receive messages rapidly and efficiently. Communication personnel are continuously prepared to establish new channels of communication and maintain existing channels.

23. LOCAL SECURITY AND DEFENSE

A command post defense plan is prepared and all personnel are instructed in their parts in the plan. Hasty entrenchments may be dug for individual protection and as part of the defense plan of the command post. Communication installations may be dug in to protect the equipment and permit continuous operation. It is important to maintain secrecy as to the location of the command post. Command posts are the special targets of hostile aircraft, mechanized units, airborne troops, and raiding parties. The use of unshielded lights is prohibited. Camouflage is used where necessary, and traffic in and out of the command post is rigidly controlled (par. 6).

24. DISPLACEMENT

Changes in the location of the command post are coordinated to avoid disrupting communication and losing control. Before a location is changed, com-

munication for the new command post is established. This requires that the signal (communication) officer be notified well in advance of the estimated time of displacement. Other units concerned are notified of the contemplated change.

25. AXIS OF SIGNAL COMMUNICATION

The axis of signal communication is the route along which future command posts of a unit will be established. It is prescribed by the next higher commander or by the unit commander concerned when a displacement of the command post is expected. It is designated by giving successive probable locations of the command post in the direction of movement or a specific route along which the command post will move. The route method normally is used in rapidly-moving situations.

Section IV. MEANS OF COMMUNICATION

26. GENERAL

Signal communication includes all means of conveying information of any kind from one person or place to another except by personal conversation and mail. Within infantry and airborne divisions, the means of communication available are *wire*, *radio*, *messenger*, *visual*, and *sound*. The composition of the means in each unit depends upon the personnel, equipment, and transportation provided by the table of organization and equipment and by the unit or higher commander. The various means of communication have different capabilities and limitations.

They are employed so that they supplement each other, and entire dependence is not placed upon any one means. The reliability of communication systems is greatly increased by the use of all the means available. The failure of a technical means does not relieve a commander of his communication responsibilities. The means employed in a given situation are generally those that provide the maximum reliability, flexibility, secrecy, and speed with a minimum of effort and material.

27. WIRE COMMUNICATION

a. General. Wire is a principal means of communication and includes the use of field wire, wire-laying and recovery equipment, cable, battery-operated and sound-powered telephones, switchboards, teletype, and associated equipment. Except for the transmission of messages such as maps and documents, wire is the most effective means of communication available in infantry and airborne divisions. It affords person-to-person conversation with break-in operation (capability of interrupting the conversation). Wire is more secure than radio communication; however, the security of classified information is never assured when transmitting in the clear over wire circuits that have not been approved to carry, in the clear, information of the classification concerned. The decision to establish wire communication depends upon the need for it and the time available to install and use it. The supply of wire on hand, the expected resupply, and the future needs are also considered. Wire communication can be used

in most terrain and situations. Tables of organization and equipment provide units with equipment to install and maintain their wire communication systems. For the employment of wire communication in various units, see the type wire system diagrams in the appropriate chapters of this manual.

b. Range. Using battery-operated telephones, the maximum operating range of field wire circuits is approximately 18 miles; the dependable range is approximately 10 miles. Using sound-powered telephones reduces the range to approximately 4 miles. The range of wire communication varies, depending principally upon the weather and the condition of the wire. Wet weather, poor splices, and damaged insulation reduce the range appreciably.

- (1) The wire operating range can be increased by the use of electrical repeaters or amplifying telephones. Cable may be used to increase the range of the telephone and the number of circuits available, but it is issued only to the division signal company.
- (2) *Spiral four* is a four-wire cable designed for fairly rapid construction and especially for using carrier equipment and repeaters. By the use of carrier equipment, the four wires will yield four telephone channels, each of which may be subdivided into four teletype channels. The use of repeater equipment at the proper intermediate points in the cable increases the range of dependable communication to at least 100 miles. This cable is vulnerable to traffic and other hazards, and

it should not be laid on the ground if the situation permits placing it overhead or underground.

c. Time Required for Installation. It takes longer to install wire communication than any other means. The time necessary for installation depends mainly upon the length of the line and the method of laying it (vehicle or man-pack). Wire lines can be laid by personnel on foot at about 1½ miles per hour and by vehicle at 3 to 5 miles per hour. In estimating the time required, it is also necessary to consider the number of personnel available, their training, the type of terrain, routes, weather, and visibility.

d. Installation.

- (1) Wire lines are usually laid by wire teams. The size of the team varies with the factors given above. Teams usually consist of three to five men, exclusive of personnel necessary to carry extra wire if transportation is not available. One man can lay a wire line by using a wire dispenser or light reel. In addition to normal methods of installation, wire may be laid from dispensers attached to light aircraft or cast a short distance over an obstacle (such as a stream) by attaching it to a rifle grenade or rocket fired from a launcher.
- (2) Wire lines are laid off roads with 15 to 20 percent slack. Wire is placed overhead in areas such as command posts, where it is impracticable to bury it or leave it lying on the ground. In crossing roads, wire is buried, placed overhead, or run under

bridges and culverts. Areas are avoided where wire is likely to be damaged by traffic or enemy fire. Part of a wire team lays the wire and the remainder of the team polices it (throws it off the road, makes road crossings, splices, etc.). The laying of a line is not delayed for the purpose of policing it.

e. Switchboards. Switchboards are used to increase the flexibility of wire systems and to reduce the number of wire lines needed. The single-line capacity of switchboards varies; by using party lines the capacity can be increased. Sound-powered telephones without ringing devices connected to switchboards require another sound-powered telephone at the switchboard to detect calls.

f. Use of Telephones. The number of telephone messages that can be transmitted simultaneously over a wire system is limited. Telephone calls are kept brief, and the telephone is reserved for occasions when there is a need for discussion and speed. During critical periods the use of the telephones may be restricted to designated personnel, except for emergency calls. Telephones are not used for long reports or orders when another means can be used effectively. To reduce the time the telephone is in use and to facilitate entry in the unit or staff journal, messages are written or notes are prepared before a conversation begins.

g. Use of Teletypewriter. Teletype communication is the principal means of transmitting messages between communication centers of division and higher unit headquarters. It may be used in other units when the volume of traffic warrants its use and

the equipment is provided by tables of organization and equipment or by higher headquarters. Teletype operators require far less training and ability than radiotelegraph operators. The teletypewriter furnishes both parties a written record of messages exchanged. It can be used on wire or radio when the circuit is of sufficiently high quality to carry teletypewriter signals.

28. RADIO COMMUNICATION

a. General. Radio is a principal means of communication. Sufficient radios are provided to make radio communication available to all commanders, including platoon leaders. Additional radios are provided for command posts, fire control, and other uses. All radio sets issued within the infantry and airborne divisions are capable of voice operation. This affords person-to-person communication between ground stations and between ground stations and aircraft. The types of radio equipment used in infantry and airborne divisions are listed in appendix II. For the employment of radio communication in various units, see the type radio net diagrams in the appropriate chapters of this manual.

b. Capabilities and Limitations. Radio communication is less vulnerable to enemy fire than wire is, but it is subject to interference from static, jamming, and other radio stations. Its reliability depends largely upon the skill of the operators. The tactical use of a radio set depends upon its characteristics. The most important characteristics of radio sets used in the infantry and airborne divisions are shown in

appendix II. To be capable of operating together, radio sets must have a common or overlapping frequency range, transmit and receive the same type of signal, and be located within proper ranges. The operating ranges shown in appendix II are for average conditions; the ranges obtained may be more or less, depending upon the skill of the operators, weather, terrain, interference, and the locations from which the sets are operated. Power lines and steel structures located close to operating sites reduce operating ranges. The best communications are obtained between sites affording line-of-sight operation.

c. Security. Radio is the least secure means of communication. It is assumed that interception takes place every time a transmitter is placed in operation; therefore, communication security is a constant consideration when using radios. The enemy obtains information merely by knowing that radios are operating. His analysis of the number of radios in operation, the volume of traffic, or the location of sets is particularly valuable as intelligence. The use of radio may be restricted or prohibited for security reasons. Two important measures for defense against enemy radio intelligence are radio silence and cryptography. Normally, messages transmitted by radio are encrypted. After all the factors have been carefully considered, decisions may be made to silence radios or to send messages in the clear. For example, radios are not silenced when the need for radio communication outweighs the value of the information that the enemy might gain. Radios usually are not silenced within units in con-

tact with the enemy. A message is sent in the clear when prompt action is called for and the urgency of sending the message in the clear outweighs the value of the information to the enemy. For further details, see paragraphs 33-36.

d. Net Message-Handling Capacity. The message-handling capacity of a radio net is limited, since only one station can transmit at a time. The time required for the transmission of a message to its addressee is primarily dependent upon whether it is sent in encrypted or clear text and upon the volume of traffic of similar or higher precedence awaiting transmission. The speed and message-handling capacity of a radio net is increased by training all operating personnel in radio procedure and net discipline and by training using personnel in message writing. Messages usually are written before transmission.

e. Radio Relay System. Radio relay may be installed more quickly over a long distance than equivalent wire facilities. However, it is normal to construct wire circuits as rapidly as possible to replace the radio relay system. This permits the radio relay system to be shifted to another area where speed of construction and installation is essential.

f. Power Supply. Power supply is essential to radio communication. Old dry batteries may reduce the ranges of sets or make them inoperative; therefore, an adequate supply of new batteries is needed for dry-battery-operated sets.

g. Remote Control. By the use of certain types of remote-control equipment, a radio operator may be located at a distance from the set he operates. Other

remote-control units connect a radio set to a switchboard, which makes the radio available to commanders and staff officers through their telephones.

29. MESSENGER COMMUNICATION

a. General. Messenger communication is a principal means and is available to all units. Most units are authorized messengers by tables of organization and equipment; other units train personnel to act as messengers in addition to their primary duties. Messenger communication is the most secure means of transmission. It is flexible and reliable. Messenger service has some limitations. It is slow, vulnerable to enemy action in forward areas, and does not afford person-to-person conversation. It is the only means available within infantry and airborne divisions for transmitting maps and documents. Messengers are used when security is required and the time of delivery by messenger will be less than that required for transmission by other means, including the time for cryptography. In units below the division level, messengers are the best means for transmitting long messages over short distances. Messengers may travel by foot, motor vehicle, or aircraft. In the combat zone, a vehicle driver in addition to the messenger usually is furnished for a vehicle used for messenger service. All commanders assist messengers in expediting the delivery of messages. The efficiency of messenger service depends upon the selection and training of the individual messenger.

b. Double Messengers. Double messengers are used when the mission involves great personal risk.

They keep within sight of each other, but far enough apart to avoid simultaneous ambush or exposure to the same shell or burst of fire. Very important messages may be sent over two different routes either by single or double messengers. Messengers are briefed on their route, rate of travel, and the location of delivery points. They are told if an answer is expected. Day reconnaissance of routes that are to be traveled at night is desirable. Oral messages are kept short and simple. They are not used when time and security permit their being written. Messengers repeat oral messages until they memorize them.

c. Types of Messenger Service. *Special messengers* are employed whenever required by the urgency of the message. *Scheduled messenger* service is established when locations are fixed and the amount of traffic warrants a fixed schedule. Messenger relay posts may be established when messages are carried frequently between the same points or units and, by reason of distance, difficulties of terrain, or hostile activity, other messenger service is ineffective.

d. Pigeons. Homing pigeons are an emergency type of messenger communication used to transmit messages from front to rear. Pigeons are not organic to infantry and airborne divisions, but are issued in mobile lofts by higher headquarters. The division signal company may issue pigeons in containers to other units, and in emergencies, they may be dropped to isolated units. Pigeons should not be kept away from their loft more than 48 hours.

30. VISUAL COMMUNICATION

a. General. Visual communication is a supplementary means and is available to all units. Visual signals are transmitted by flags, lights, pyrotechnics, panels, arm-and-hand signals, and other prearranged visual means, such as aircraft maneuvers. They are suitable for transmitting prearranged messages rapidly over short distances. They are very vulnerable to interception, and their use may be prohibited for security reasons. The enemy may use similar signals for purposes of deception and confusion. Visual signals are easily misunderstood. They cannot be used during periods of poor visibility or when line-of-sight locations are not available.

b. Flags. Flags are issued to tank units and to the division reconnaissance company. Other units may improvise flags. Messages may be sent with flags by using the semaphore or International Morse Codes and by using prearranged signals.

c. Lights. Lights for communication purposes only are not items of issue. They may be used to send prearranged messages such as identifying units as friendly. The meanings are given in the unit SOI, or prescribed by the commander. Messages may be transmitted by lights, using the International Morse Code.

d. Pyrotechnics. Pyrotechnics, including smoke, are issued in various colors and types. The meanings of certain signals are given in the unit SOI. Signals usually are included for identifying units as friendly, lifting or calling for fire, marking targets, and reporting an objective reached. To be effective the

transmission and reception of pyrotechnic signals are preplanned. Pyrotechnics may be used for communication within and between ground units, between ground units and aircraft, and between ground units on shore and ships.

e. Panels. Two general types of panels are issued for communication with aircraft—marking and identifying panels and those for transmitting messages. Marking and identifying panels are made in bright fluorescent colors. They may be used to mark positions and identify units as friendly. Black and white sets of panels for transmitting messages are issued for use on light and dark backgrounds, respectively. They are used to transmit brief messages or to identify a particular unit. This is done by using the combined panel system and panel recognition code, which is included in the unit SOI.

f. Infrared Devices. Infrared devices are used for signaling and as landing and assembly aids. In amphibious operations, they are used as landing aids. Airborne units employ them as assembly aids.

31. SOUND COMMUNICATION

Sound is a supplementary means of communication and is available to all units. Sound signals are transmitted by whistles, bugles, horns, gongs, klaxons, weapons, and other noise-making devices. They are used chiefly to attract attention, transmit prearranged messages, and spread alarms; they are kept simple to prevent misunderstanding. They are a rapid means of communication over short distances. Their range and reliability are greatly reduced by

battle noise. Sound signals are very vulnerable to interception, and their use may be prohibited for security reasons. Sound signals and their meanings are prescribed in the unit SOI, or are assigned by commanders or by patrol leaders. Three long blasts of a whistle, horn, siren, or klaxon repeated several times, or three equally spaced shots or short bursts of fire normally are used to warn of an air or mechanized attack. Rapid and continuous percussion sounds made with the standard gas alarm or improvised devices such as iron rails and empty shell cases normally are used to warn of a gas attack.

32. INTEGRATION OF WIRE AND RADIO COMMUNICATION SYSTEMS

Wire and radio have been discussed as being two separate and distinct means of communication. In operations they may be closely integrated by using remote-control equipment, radio relay equipment, and wire communication equipment. For further details on remote-control equipment and the interconnection of radio and wire systems, see TM 11-488.

Section V. COMMUNICATION SECURITY

33. GENERAL

a. Communication security is the protection resulting from all measures designed to prevent or delay unauthorized persons from gaining information of military value from communication sources. It includes *physical*, *cryptographic*, and *transmission*

security. Commanders see that communication security orders and regulations are understood and observed by everyone concerned with communication. Officers and enlisted men who personally transmit radio messages are particularly concerned with security measures.

b. The commander establishes communication security measures by stating general principles in the unit SOP, by announcing before an operation the extent to which security is to be practiced in that operation, and by making security decisions during an operation. When prompt action is called for, he considers time in which the enemy can act on the information contained in a clear-text message. He then decides whether the urgency of sending a message in the clear outweighs its value to the enemy. Messages that might compromise the plans, operations, or cryptosystems of other units are not transmitted in the clear. Messages to be transmitted in the clear by radio operators (including those sent through message centers) are marked *Send in clear* and are signed by the commander or his authorized representative (par. 36).

34. PHYSICAL SECURITY

Physical security protects signal equipment and classified documents (including plain-language copies of messages and carbons) from capture, damage, or loss. Critical items—SOI, codes, and ciphers—are limited in distribution. Complete SOI are not taken forward of front-line battalion com-

mand posts. Before a command post is vacated it is inspected for messages, carbons, converter tapes, and copies of maps or orders. Measures are taken to prevent the enemy from tapping wire lines. When SOI or cryptomaterials are lost or captured, the facts are reported promptly to the next higher commander. Instructions are issued on how to destroy equipment and classified documents to prevent their capture or use by the enemy.

35. CRYPTOGRAPHIC SECURITY

Cryptographic security is attained by proper use of technically sound cryptographic systems. Strict observance of cryptographic operating instructions is essential to reduce the effectiveness of the enemy's communications intelligence effort. Time spent in encrypting gives a high return in security. The use of unauthorized cryptosystems is strictly forbidden. Most systems not authorized by the Department of the Army are susceptible to easy solution and give the user a false sense of security. Security hazards may be minimized by being brief and avoiding stereotyped phraseology in the preparation of messages (particularly at the beginning and end of a message). Identical messages are not sent in both clear and secret text or in more than one cryptographic system. When clear text is used landmarks that can be associated with encrypted map locations are avoided as references. Individuals and small units that do not have cipher devices use pre-arranged and operation codes when messages cannot

be sent in the clear. When the same codes are used by several units, clear and encrypted texts (except coded map locations) are not mixed in the same message.

36. TRANSMISSION SECURITY

Transmission security measures limit the opportunities of the enemy to intercept transmissions and prevent him from using our communication systems for deception purposes. A message is transmitted by the most secure means available, consistent with its precedence. Radio is particularly susceptible to interception, position-finding, traffic analysis, and deception. Personnel operating radios are trained in correct procedures so they will not divulge information to the enemy through faulty operating procedures or techniques. Operators and personnel preparing messages for transmission by radio must be aware of the ability of the enemy to gain information from radio traffic. Those transmitting clear-text messages by voice radio use prescribed radio-telephone procedure and preplan the content and wording of each transmission. Authentication systems are used as prescribed, and unnecessary transmissions are eliminated. A high standard of net discipline among operators is essential in maintaining communication security. Training in the correct procedure is continuous. For additional information on communication security, see AR 380-5 and JANAP 122.

Section VI. COMMUNICATION TRAINING

37. INDIVIDUAL TRAINING PHASE

Communication training is conducted in three phases—*individual*, *unit*, and *combined*. During the individual training phase, communication personnel are instructed in basic military subjects. Each man is taught how to fight. They also receive some specialist training in their primary duties. (TM 11-450, TM 12-406, and TM 12-427.) This training is conducted best in division and lower unit schools, and is particularly applicable to radio operators. Certain specialists, such as communication officers, communication chiefs, cable splicers, and radio and radar repairmen, should receive their training at service schools. During this training phase teamwork is also taught. Commanders insure that appropriate personnel (in addition to assigned communication personnel) receive communication specialist training (par. 2).

38. UNIT TRAINING PHASE

During the unit training phase, specialist training is completed and communication personnel are trained in communication techniques for all types of tactical operations. Before exercises involving entire units are held, command post exercises are conducted with commanders and staffs present. This develops skill in procedures for the installation, operation, and movement of command posts. Units are trained in the installation, operation, and maintenance of communication systems in fast-moving situa-

tions, during all conditions of weather and visibility, and over all types of terrain.

39. COMBINED TRAINING PHASE

In the combined training phase, tactics and techniques of communication units working with higher, supporting, supported, attached, and adjacent units are perfected. This phase includes field exercises and maneuvers involving units of the combined arms. As specialists become proficient in their primary duties, they are rotated to learn the communication duties of other selected key members of their unit. For further details, see current Army Training Programs.

CHAPTER 2

SIGNAL COMPANY, INFANTRY DIVISION

Section I. ORGANIZATION

40. GENERAL

a. The infantry division signal company is organized as shown in figure 1. It performs all signal activities for division headquarters and certain signal activities (such as photography) for the entire division. It operates communication means down to but not within the major units of the division. The numerical designation of the signal company is usually the same as that of the infantry division to which it is organic.

b. For administration the signal company is organized into platoons and sections. For field operations, the signal company is organized into working teams. To provide 24-hour service each team is organized into reliefs. The composition of these teams varies in different situations and organizations. Varying tactical conditions cause modification of the number and composition of the teams and reliefs. The teams from the sections are consolidated into two groups—a *command post group* and a *rear echelon group*—so named because of their employment in division headquarters echelons. In addition to these two main operating groups, the signal company may provide wire construction, maintenance, and radio teams for

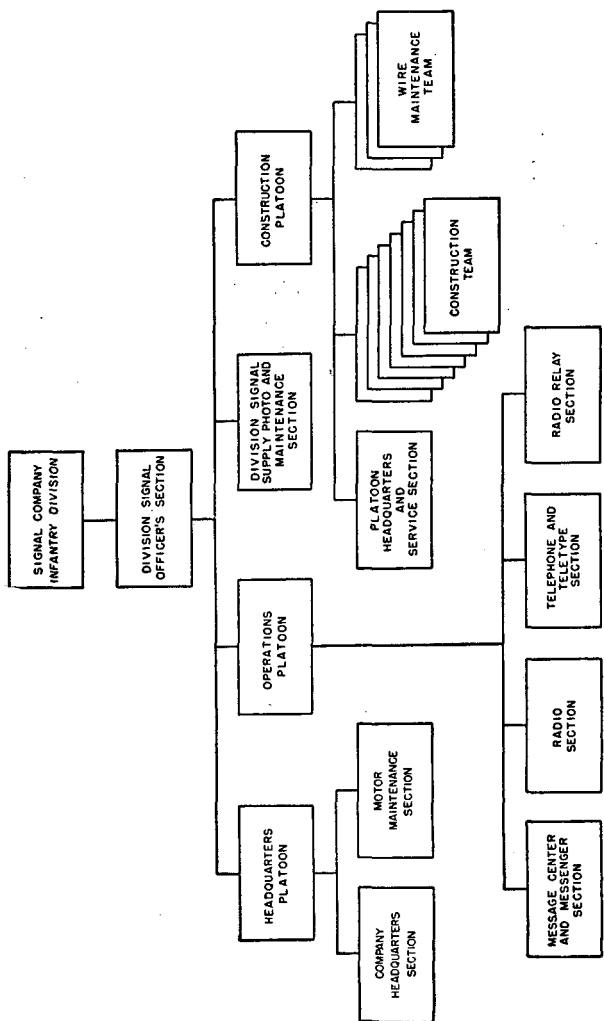


Figure 1. Organization of the signal company, infantry division.

division units. The division standing operating procedure defines their composition. The company commander and his platoon leaders coordinate their efforts to develop working groups which respond quickly and efficiently to changing situations. Flexibility of organization is stressed through the training phase.

- (1) The *command post group* is larger than the rear echelon group, since it must be more flexible to meet the communication requirements of changing tactical conditions. It includes enough personnel to install, operate, and maintain communication facilities at a new command post location (the advance party), at advance communication centers, and for other installations without adversely affecting communication at the existing command post. The advance party consists of the minimum personnel required for the mission. To provide continuous communication during the displacement of the command post, the advance party establishes the communication facilities at the new location before the command post moves. The old command post closes when the new command post opens. The remainder of the command post group (command post party) recovers the signal equipment at the old location and rejoins the advance party to aid in expanding the installation and in operating established facilities. When it is necessary to establish an advance communication center and a new command

post simultaneously at different locations, the command post group is further subdivided.

- (2) The *rear echelon group* consists of the minimum personnel needed to provide communication for the rear echelon of division headquarters when this echelon is not located with the command post proper. Normally, the rear echelon displaces in a single serial. However, it can, when necessary, displace in a manner similar to that described for the command post. If the movement is to an old command post location, the rear echelon group takes over some of the established facilities.
- (3) Signal company *administrative and non-operating personnel* remain at the company bivouac, which is near the division command post. The bivouac is always located so that reserve operating and construction teams are available for special emergency missions. A detachment of the company bivouacs with the rear echelon.

41. DIVISION SIGNAL OFFICER'S SECTION

The division signal officer's section is composed of the division signal officer, the assistant division signal officer, and enlisted personnel. (For duties of the division signal officer, see par. 7.) The assistant division signal officer performs duties prescribed by the signal officer, and in the absence of the signal officer, assumes his duties.

42. DIVISION SIGNAL SUPPLY, PHOTO, AND MAINTENANCE SECTION

The division signal supply, photo, and maintenance section works under the direction of the signal officer. It is usually located in the signal company bivouac. Probable locations include the division ordnance company, the division service area, the division rear echelon, or the division quartermaster company. Each group in the section is commanded by a commissioned officer.

a. The *signal supply group* supervises the procurement, storage, and issue of signal supplies and equipment for divisional and attached units. This group is also charged with the evacuation of captured enemy equipment and the turn-in of equipment for repair to higher echelons.

b. The *photo group* operates in teams. By using still and motion-picture equipment, it provides the division with limited ground photographic coverage. It can also provide limited aerial photographic coverage, but aircraft are not organic to the section. The photo group includes laboratory-technician and developing equipment and can develop and print a limited number of still photos.

c. The *signal maintenance group* is equipped to maintain all signal equipment in the signal company and to perform field signal maintenance for all units in the division. The group usually is located with the division signal supply, photo, and maintenance section. It also includes mobile radio and radar maintenance teams, the use of which is directed by the division signal officer.

43. COMPANY HEADQUARTERS

The company headquarters consists of an administrative section and a motor maintenance section.

a. The *administrative section* includes personnel and equipment necessary for company administration, supply, and messing. It is commanded by the company commander, who is assisted by the first sergeant. The administrative section is normally at the company bivouac. Some of the mess personnel may be used at various other locations, and some administrative work may be carried on at the division rear echelon.

b. The *motor maintenance section* consists of the company motor (warrant) officer and enlisted personnel. It performs organizational motor maintenance, operates the company motor pool, and maintains organizational gasoline-driven power units.

44. CONSTRUCTION PLATOON

The construction platoon is commanded by the field line construction officer. It is divided into a platoon headquarters and service section, seven construction teams, and three wire maintenance teams. The platoon is charged with construction and maintenance of wire lines between the echelons of division headquarters and from these echelons to the headquarters of next subordinate units. The platoon is also charged with picking up and rehabilitating wire.

a. The *platoon headquarters and service section* includes the platoon leader; his assistant, the field lineman (construction) chief (a noncommissioned officer); and enlisted personnel. The service section

personnel transport wire and other supplies and materials needed for field wire line construction. The service section recovers field wire and services it. The personnel and equipment of this section may be used to augment the construction teams.

b. Construction teams consist of enough personnel and equipment to operate as self-contained units. They may be attached to each regiment. Teams may work at the division command post, at regimental combat team headquarters, or other locations. Teams use large trucks equipped with wire-laying reel units and wire construction equipment for installing wire and small trucks for policing lines, cross-country laying, and trouble shooting. Team personnel police the lines, make overhead crossings, perform routine maintenance, and recover wire.

c. Wire maintenance teams maintain the wire lines installed by the construction teams and service and prepare wire for future use that has been recovered by the construction teams. Wire maintenance teams also construct short trunk and local lines. Teams usually work directly out of division headquarters and under supervision of the construction chief.

45. OPERATIONS PLATOON

The operations platoon is divided into four sections—message center and message section, radio section, telephone and teletype section, and radio relay section. These sections operate at all echelons of division headquarters and at all other points where communication facilities are required by the division.

a. The *message center and messenger section* consists of an officer, two warrant officers, and enlisted personnel who provide continuous message center and messenger service for division headquarters. This section is divided into two teams—one team operates at the division command post communication center and the other at the division rear echelon communication center. To establish an advance communication center or to displace the command post, the message center and the messenger team assigned to the command post group are each divided into two teams. A team of each remains at the command post while the others work with the advance party. Each team of the message center and messenger section is divided into reliefs to maintain continuous service. For a detailed description of communication center site selection, procedure, and messenger service, see FM 24-17.

b. The *radio section* consists of an officer (who may be designated division radio officer) and enlisted personnel who install, operate, and maintain all radio communication facilities at division headquarters. The section is divided into a number of teams, depending upon the number and type of radio sets and operating personnel. The section also furnishes radio teams (with signal company sets) to accompany elements of the division and to provide radio communication in established or special radio nets. If possible, at least one team with suitable equipment and operating personnel is kept in reserve at the command post for special missions. Teams operating in nets in continuous service are large enough to divide into reliefs. All operators are trained in

the operation of all types of sets used by the section. Such multiple training permits the shifting of operators from one team to another (personnel assigned to a certain team remain with that team except in emergencies). Radio teams are normally assigned to the command post group and to the rear echelon group. When an advance communication center is established or when the command post is displaced, the teams with the command post group are split between the command post and the new location to provide radio communication at both places.

c. The *telephone and teletype section* consists of the wire operations officer (may be designated division wire officer) and enlisted personnel who install, operate, and maintain the wire installations located at division headquarters and at switching centrals installed as part of the division wire system. The section also installs and maintains local and short trunk circuits. The construction platoon may assist this section in installing long local circuits. The section may assist the construction platoon in maintaining all wire circuits. The section is divided into teams that install, operate, and maintain the telephone and teletypewriter equipment at all echelons of division headquarters. To give continuous service the teams are further divided into reliefs. When the command post is displaced or an advance communication center is established, the team with the command post group is divided between that group and the advance party.

d. The *radio relay section* consists of an officer and enlisted personnel, with equipment, organized into teams that provide voice and teletype radio relay

channels between division headquarters and regimental combat teams. It may provide other channels. Organic equipment (mounted on large trucks) allows each team to install and operate one terminal of a radio relay channel. Teams normally do not provide a radio relay terminal at the division for communication with corps. This terminal is provided by a team from Corps Signal Battalion. The teams can—

- (1) Establish communication in situations where it is not feasible to install a complete wire circuit.
- (2) Operate an alternate circuit when wire circuits develop trouble.
- (3) Provide a means of spanning ground denied to wire teams by the enemy or by different terrain features.

Section II. COMMUNICATION DURING A CONCENTRATION

46. GENERAL

a. An infantry division may be concentrated as an independent unit or as a part of a larger force. For details of the various factors that affect communication during a concentration, see FM 100-15.

b. The following actions, characteristic during concentration of an infantry division, are of interest to the signal officer since they provide information useful in planning communication:

- (1) A concentration area is selected by the division commander or designated by a higher commander.

- (2) The area is reconnoitered.
- (3) Security forces are sent to the area.
- (4) The elements of the division move to the concentration area.
- (5) Commanders arrive with the leading elements of their commands.
- (6) Planning, training, supply, and evacuation are continuous from the arrival of the first elements until the area is vacated.

47. PLANNING FOR COMMUNICATION

During the planning for a concentration, the signal officer insures adequate communication by—

a. Conducting a reconnaissance to obtain detailed information of existing signal facilities in the concentration area. During reconnaissance he tentatively selects command post sites and messenger routes, and makes arrangements for use of existing commercial communication facilities in the area.

b. Preparing a signal plan for the movement into the concentration area and for the period of the concentration. This includes use of wire systems, establishment of telephone stations along march routes, and operation of messenger service. Radio operation is restricted or prohibited during this period.

c. Making provision for signal company teams to accompany initial elements of the division into the concentration area.

d. Arranging for communication details of units to accompany their leading elements.

e. Preparing recommendations for the establishment of all unit headquarters at locations which facilitate communication.

f. Taking suitable steps for the adoption and maintenance of communication security measures.

48. COMMUNICATION ACTIVITIES DURING A CONCENTRATION

During the concentration period the signal officer and the signal company are engaged in training, signal supply, and other communication activities. The extent to which these activities are carried on depends on the status of training, adequacy of equipment, number and capabilities of personnel, and factors peculiar to the contemplated operation. Photography is not a normal activity during this period, but may be done as personnel limitations permit. The more important activities are—

a. Revising the existing SOP or preparing a new SOP to meet requirements of anticipated operations.

b. Training personnel in the installation, operation, and maintenance of new or special equipment provided for the operation. Training of personnel in modified or new techniques.

c. Studying enemy characteristics and adopting special precautions for the successful performance of missions incident to the planned operation.

d. Formulating specific communication security measures for the anticipated operation in addition to all normal security methods (modified if necessary).

e. Training personnel in the protection of military information and communication security procedures.

f. Assisting in the establishment of information channels for the communication intelligence service.

g. Insuring technical inspection of all signal equip-

ment in the division to check its operating condition and adequacy.

h. Replenishing shortages and replacing unserviceable items.

i. Establishing liaison with the signal supply source in initiating procurement of signal equipment and supplies for future operations.

j. Establishing and maintaining a signal supply point for the division.

k. Making a detailed reconnaissance to plant the communication system for anticipated operations in such a way that it can be modified to easily meet future requirements.

l. Installing, operating, and maintaining the communication system.

m. Preparing SOI and SSI.

n. Drafting plans for future operations and making preliminary provisions for the execution of such plans.

49. TACTICAL APPLICATION OF COMMUNICATION

a. General. The division commander may require communication from the command post in the concentration area to detraining and detrucking points, to division security and reconnaissance forces, to the division rear echelon, to headquarters of division units, and to division supply and evacuation establishments within the area. For a type wire system, see figure 2.

b. Communication Centers. Communication centers are operated at both the command post and the

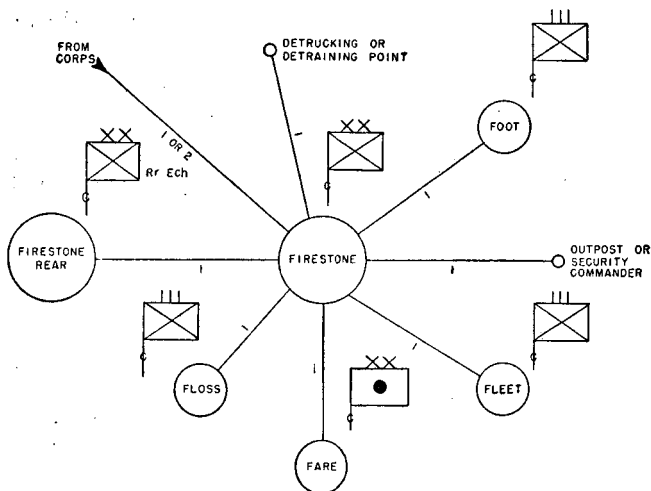


Figure 2. Type wire system for an infantry division during a concentration. (Lines may be laid to other units if time permits and the distances are not too great.)

rear echelon (if the latter is separate from the command post). They may also be desirable at entraining and detraining points operating as advance communication centers.

c. Messengers. Messengers are available at each established communication center. The signal officer determines whether the volume of message traffic and the location of communication centers serving the division and its elements warrant the establishment of scheduled messenger service.

d. Radio Communication. Radio stations in the concentration area are silenced when secrecy and surprise are essential to the success of the concentration, except that limited use may be necessary

for warning and for reconnaissance forces in contact with the enemy. Other means of communication that provide greater security are used.

e. *Wire Communication.* Wire installation within the concentration area are held to a minimum unless the division rear echelon is expected to remain in the area after the start of operations. (Figs. 2 and 3.)

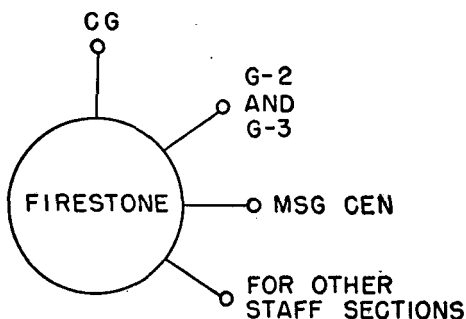


Figure 3. Minimum local lines needed during a concentration.

Section III. COMMUNICATION DURING MARCHES AND HALTS

50. GENERAL

Marches by an infantry division may be made in one or more stages. They may be made in one or more columns moving on one or more routes, by a combination of marching and motor transport, or by a complete motor movement. For any march movement, the minimum essential communication for control of the moving columns is provided. The signal officer is given information of the march plan in

sufficient time for the signal company to be able to provide the required facilities.

51. MOVEMENT OF THE SIGNAL COMPANY

The movement of the signal company is influenced by the location from which the division commander controls the moving columns.

a. When the division commander remains at the command post in the concentration area or old bivouac area, planning to move to a forward location to be secured by advanced elements, the advance party of the command post group may accompany the marching columns, or may move subsequent to the start of the march. This party moves directly to the designated location of the new command post and arrives there in time to complete the installation of communication facilities by the time the command post is scheduled to open. The command post group or the rear echelon group continues to operate the facilities at the old command post. If the command post group continues the operation, it closes the old location and moves to the new location when notified that the advance party has established and is operating the communication system at the new command post. The rear echelon group may continue operation of communication facilities at the old location for the division rear echelon or other division installations.

b. When the division commander, accompanied by elements of the division headquarters, moves with one of the marching columns, the command post group of the signal company ordinarily accompanies

that column. The advance party precedes the division commander when possible and establishes communication in the new command post location before his arrival. When the advance party is unable to precede the division commander, it usually marches in the same column and close to him. The command post group may be placed in any position in any column, but its arrival at the new command post is not unduly delayed. The movement of the rear echelon group is governed by the movement of the division rear echelon.

c. Additional control agencies (advance communication centers or control points) may be established at successive locations along the route of march. In such cases, teams from the command post group are designated to establish communication at these points. When a march is made in more than one column, radio and wire construction teams are frequently attached to each column to facilitate communication on the march and to expedite the establishment of communication upon completion of the march.

52. MOTOR MOVEMENT BY SHUTTLING

The methods outlined in paragraph 51 are, in general, applicable to movements of the division when shuttling with its organic transportation. The size of the advance party of the command post group moving on the first shuttle is determined by the extent of the communication system to be installed upon completion of the march, the time available for its installation, and the time required to bring up

the remainder of the command post group. It is seldom feasible to use the vehicles of the operations and construction platoons for shuttling personnel or equipment. These vehicles are required for communication tasks incidental to the movement and to subsequent operations. The standing operating procedure prescribes the normal use of the signal company during shuttling operations.

53. COMMUNICATION WHILE COLUMNS ARE FORMING

Maintenance of adequate communication is critical during the time between the closing of unit command posts and the arrival of the unit commanders at the heads of their march columns. When the division command post is to remain in place, wire lines may be installed from the command post to initial points or critical points on the route of march. These, supplemented by special messengers, usually suffice. When time does not permit the installation of wire circuits, communication between the command post and initial points may be provided by radio and messengers. While units are moving to their march positions, communication from the division command post to unit command posts may also be by radio and special messengers. Radio teams from the signal company may be attached to units to provide radio communication. Radio also may be used advantageously to provide communication between staff officers supervising the organization of march columns, especially in situations where the

different units are widely separated. The use of radio transmitters is subject to security restrictions.

54. COMMUNICATION DURING MARCHES

a. General. During marches, communication is provided from the division command post to reconnaissance and security elements operating under division control, to command posts of column commanders, to advance message centers, to control points, and to the rear echelon. Communication within the various reconnaissance and security elements of any column is the responsibility of the column commander.

b. Communication Centers. Communication centers are established at the division command post, at the rear echelon, and at control points and advanced locations designated in the march plan. When the division commander accompanies the division on the march, communication center operations are conducted in a vehicle moving with the march command post. To permit advancing by bounds a message center team of two reliefs is provided for each communication center. When an advanced communication center is used, the assignment of a team consisting of only one relief is sufficient.

c. Messengers. The number of messengers and the type of service provided at each communication center varies with the size of the echelon served.

- (1) *Motor messengers* are indispensable at the message center of the march command post. At least one messenger vehicle is detailed to follow the division commander's vehicle.

Motor messengers may also be detailed to follow designated staff vehicles, the message center vehicle, and operating radio vehicles. Scheduled messenger service is seldom practicable during the march, except for service between the command post and rear echelon. Whenever possible, messengers not used during the march are supplied with transportation and encouraged to rest so that they can relieve other messengers at the end of the march. Messengers are trained in march operations, including the passing of messages between vehicles with an improvised message stick and the use of prearranged signals to call messengers to vehicles.

- (2) When aircraft are available, *air courier service* is used to supplement motor messenger service.
- (3) When *pigeons* are provided, they are distributed before the start of the march to reconnaissance and security elements and to communication personnel serving column commanders. When pigeons are used, arrangements are made for the relay of messages from the loft to the march command post. (For additional information on pigeons, see FM 11-80.)

d. Radio Communication. The employment of radio communication during the march is based on security, rapidity of maneuver, necessity for surprise, and the necessity for rapid communication from and within any unit coming into contact with

the enemy. Radio is frequently the only adequate means for communication between rapidly moving or distant units and between air and ground.

- (1) The *command net* includes stations at the division command post, at each column march command post, and, on occasion, at control points and advance message centers. (Fig. 4.) If it is necessary for any radio to leave the column to operate, a pre-arranged schedule with that radio is established. The command post station also maintains constant watch on the assigned frequency so that the march column is able to contact division headquarters at any time. The command net may be silenced when an adequate wire net has been established in the new bivouac area.
- (2) The *division reconnaissance net* includes stations at the command post, in the reconnaissance and security elements under division control, and in aircraft observing for the division. Stations of the signal company may be attached to these elements. Operation of the net is continuous, and stations are silenced only when maintenance of absolute security is essential.
- (3) Generally, the operation of a separate *warning net* is not desirable because it requires the use of a disproportionate number of radio sets and operators. If such a net is operated, the net frequency is selected to permit as many units as possible to listen.

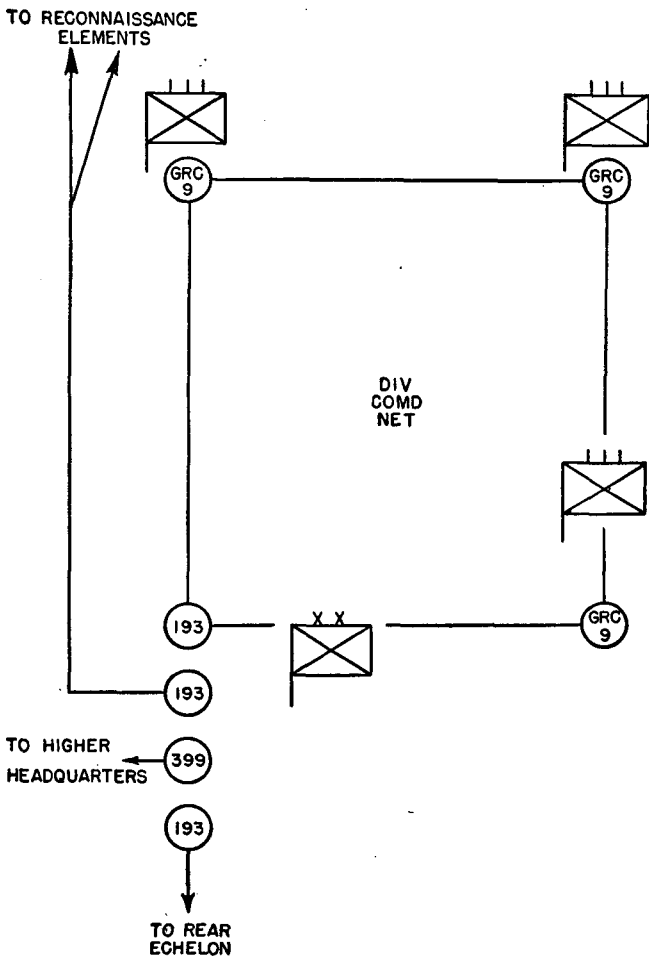


Figure 4. Type radio nets for an infantry division moving in two columns.

Transmissions in this net are restricted to warning signals.

e. Visual Communication. Panels and pyrotechnics, including colored smoke, are the principal means of visual communication used during the march. Friendly aircraft may warn marching troops of impending hostile attacks by flying over the columns and using prearranged wing signals or pyrotechnics.

(1) *Panels* may be used to mark the march message center vehicle in column, to identify units on call from friendly aviation, and to transmit short messages. They are operated by either message center or radio teams.

(2) A special, prearranged *pyrotechnic code* may be prescribed for use on the march. If higher commanders have prescribed a code, the division requests authority for assignment of desired special meanings. Lookouts are provided to watch for pyrotechnic signals and to relay messages to communication centers. Colored smoke furnishes a rapid means of sending short prearranged messages to aircraft in flight.

f. Wire Communication. Full use is made of existing wire facilities in the zone of advance. When control points or advance message centers are located near commercial wire circuits, arrangements are made to use these circuits. When columns march on roads that are paralleled by commercial wire lines, arrangements may be made to establish wire communication over such lines at specified times, such as during the hourly halts. Commercial cir-

cuits may also be used between the march command post and reconnaissance and security elements. Such circuits are used either by tapping the wires at the desired points or, when the march is made in friendly territory, by arranging with the commercial company for the desired service. To reduce the probability of enemy interception of transmissions, circuits which lead into enemy-occupied territory are interrupted at a point beyond which use of the wire by friendly forces is not expected in the near future. Such interruptions are made in such a way as to permit easy restoration of the circuits and extension of the wire system. When the use of wire communication is contemplated, teams from the construction platoon, the telephone and teletype section, and the radio relay section are attached to those elements of the division where this communication is to be used. These teams, if augmented by security personnel, may reconnoiter existing wire communication systems in unfamiliar territory.

55. PRECAUTIONS FOR SECRECY ON THE MARCH AND DURING HALTS

a. The commander prescribes restrictions to be imposed on the use of communication facilities during the march. When radio communication is prohibited, the other communication means may become overburdened. For this reason operations of the signal company then require careful planning, painstaking attention to detail, and a high order of discipline.

b. During daylight hours, parties reconnoitering

routes and bivouacs and teams constructing, repairing, or readjusting wire lines are kept to a minimum, both in number and size. Vehicles used by such teams move singly. Wire construction teams keep concealed, especially when hostile aviation is active. Parked vehicles are concealed. All vehicles comply with traffic control measures.

c. During hours of darkness, exposed lights and fires are prohibited. Lights used by communication operating personnel are shielded. Motor elements travel in small groups, moving intermittently.

56. HALTS DURING THE MARCH

Communication personnel take advantage of halts to tap wire circuits, to communicate with aircraft observers by panels or drop and pick-up messages, and to check and adjust equipment.

57. HALTS AT COMPLETION OF A MARCH

The bivouac area of the signal company is located near the division command post. Vehicles of the company are parked in concealed locations in or near the company bivouac so as to minimize traffic difficulties near the command post.

58. LOCATION OF COMMAND POSTS DURING HALTS

a. The orders directing a halt usually show the location of the division command post. The division commander selects the location (when it is not prescribed by a higher commander), usually on the

recommendation of the signal officer. Higher commanders and unit commanders are promptly notified of the selected location. During the halt, the message center is kept advised of the locations of the various staff sections and units.

b. The signal officer is prepared to recommend suitable locations for the command posts of each major unit and of outposts under division control. He recommends command post locations within the bivouac areas of units.

59. COMMUNICATION DURING HALTS

a. *General.* In planning a communication system for use during the halt, factors considered are—

- (1) Location of communication installations and elements of the signal company within the bivouac area in relation to the next operation.
- (2) Amount and types of communication required by the division commander for reconnaissance, security, and administration.
- (3) Desirability of providing a simple, adequate, and flexible communication system.
- (4) Conservation of signal supplies to insure availability of sufficient quantities for the next operation.
- (5) Rest and comfort of the signal troops.

b. *Communication Centers.* The schedule for reliefs at communication centers is arranged to cover the period the command post is expected to remain in the bivouac area. Personnel not required for duty are sent to the company bivouac to rest.

c. Messengers.

- (1) Local messengers are informed of the locations of the various offices at the command post and the officers on duty at each. When a halt is made during darkness, messengers reconnoiter routes from the communication center to the other installations in the vicinity. They are informed who is scheduled to relieve them and when and where their relief may be located in the company bivouac.
- (2) The signal officer determines whether special or scheduled messenger service, or both, is to be provided. The duties of some messengers on the march are fatiguing and their need for rest during the halt is considered. Special messenger service is normally adequate during halts between march stages. If the halt is long, scheduled service is established. There are two periods during a halt when the use of special messengers is essential—at the beginning of the occupation of the bivouac area and at the time warning orders and other instructions relative to the next division operation are issued.
- (3) Although pigeons provide an emergency means for the transmission of information from reconnaissance elements and outposts to the command post, time seldom permits the settling of pigeons at a loft in the bivouac area. Pigeons from lofts at higher headquarters may be available. Arrangements are made for transmission of pigeon-carried messages from the loft to the addressee.

d. Radio Communication. Restrictions placed on the use of radio during a march usually are applicable during a halt. The reconnaissance net is operated when security permits. Stations in the command nets may be placed in a stand-by status (ready for operation), but transmissions from these stations are normally prohibited. Operation in the corps nets is as directed by the corps commander. Radio stations are located as near as practicable to the message center. Radio equipment used during the march is inspected and restored to operating condition if it is in need of repair or adjustment.

e. Visual Communication. When reconnaissance aviation is working with the division during a daylight halt, visual communication means may be used. A panel station is established, but it is not located near the command post or bivouac area—particularly if hostile aviation is active. The panel station, combined with the message-dropping and pick-up ground, is normally located near the command post station of the air-ground net. Panel operators may be detailed to fire pyrotechnics and to watch for pyrotechnic signals.

f. Wire Communication. Wire facilities installed in the bivouac area are held to the minimum. Installations made during hours of darkness may require adjustment at dawn. When the halt is made in friendly territory and commercial wire facilities exist within the bivouac area, arrangements are made for their use. When it is impracticable for the commercial company to operate these facilities, they may be taken over and operated by the signal company.

60. SIGNAL SUPPLY

Signal supplies, including expendable items, for the march are distributed before the movement. If it becomes necessary to issue additional supplies at halts, the signal company bivouac may be designated as the signal supply point.

Section IV. COMMUNICATION DURING DEVELOPMENT

61. GENERAL

During development of the division, columns break up into smaller groups, move on assigned march objectives, or move to assembly positions preliminary to deploying for attack or defense. The signal company is prepared to meet the communication requirements created by the changing tactical situation.

62. COMMAND POSTS

a. The signal officer must obtain early information of the contemplated action. He is prepared to recommend locations for the division and unit command posts, and he is ready to issue warning orders to the signal company. The advance party of the command post group moves directly to the selected command post location and begins installing the communication system. The command post group, if functioning in the old bivouac area, is ordered to close at the old location at the same time the new command post opens. It moves by a definite route to the new location and it arrives at a specified time.

The rear echelon group may displace or remain in its established location to conform with the announced plan for the rear echelon.

b. If the unit command posts of major subordinate units are to be occupied for an appreciable time, they are usually located in the respective unit assembly areas; otherwise, they are set up in the initial battle positions. Command posts are located well forward where they will have the greatest protection against hostile ground, air, and airborne attack, and where the routes to its units facilitate installation of the wire system and expedite messenger service. The unit command posts of major subordinate units should be accessible by two or more routes from the division command post.

63. TACTICAL APPLICATION OF COMMUNICATION

a. General. There is no break in the operation of the communication system during development. A properly planned operation insures a communication system capable of being modified to meet the requirements of development and deployment. (FM 100-5.)

b. Communication Center. The communication center of the march command post may continue operation during development. If a communication center is not used on the march, one is established promptly at the command post by teams from the advance party. If a temporary command post has been designated, it may be necessary for the command post group to establish an advance communi-

cation center at the probable battle command post location.

c. Messengers. The difficulties of messengers are increased during the development when units are changing locations and several units are using the same routes. Units notify the division message center of the locations of their command posts. All messengers are instructed concerning routes and locations of the units to which they are dispatched. Scheduled messengers are used from the command post to the rear echelon, and when unit locations become stabilized, to the unit command posts.

d. Radio Communication. The extent to which radio is used depends on the requirements for secrecy and surprise as balanced against the need for this means of communication.

- (1) If security permits, the *division command net* is operated during development. Operation of secondary stations in such nets may be limited to combat units in contact with the enemy. A radio channel may be established between the command post and the covering force under division control. If the covering force does not have suitable radio equipment, the necessary equipment and operating personnel are allotted from the signal company. Transmissions are prohibited from radio stations of units whose locations are to be concealed from the enemy. Radio transmission of messages to silent stations may be accomplished by either the broadcast (F) or the intercept (I) method. (JANAP 124.)

- (2) Usually, there is no reason for curtailing radio operations in the *reconnaissance net* during the development. The commander needs this channel of communication to receive timely information of the enemy.

e. Visual Communication. When there is a possibility that enemy air or ground elements may observe signals, secrecy and surprise requirements may make it necessary to prohibit the use of visual signals by elements not in contact with the enemy.

f. Wire Communication. Every effort is made during the development to establish the wire system required for combat. Installation of lines which cannot be used during combat is held to a minimum. The signal officer prescribes the use of existing commercial wire facilities. In some cases, wire circuits from the division command post to the unit command posts can be conveniently routed through the assembly area command posts of these units. Such routing may be prescribed so that the wire system for the development may be extended and used for succeeding operations. When a construction team has completed construction of wire lines to an infantry regiment, the team remains at the command post of the regiment to—

- (1) Be available to maintain the wire lines to the division.
- (2) Be prepared to extend the division wire lines when the command post moves.
- (3) Be prepared to aid the infantry communication personnel as directed by the signal officer.

Section V. COMMUNICATION DURING THE ATTACK

64. GENERAL

a. The attack in a meeting engagement demands speed in execution, the widest possible exercise of initiative by unit commanders, rapid transmission of orders, and prompt action. The division attack of an organized position is a more deliberate process requiring thorough reconnaissance and a maximum of coordination among all components of the attacking forces. The time available before an attack has a direct bearing on the extent of the communication system to be installed. (FM 100-5.)

b. Attack maneuvers are classified as envelopments and penetrations. Regardless of the form of the attack, troops of the division are distributed in two tactical groupings—the *main attack* and the *secondary attack*. The signal officer and signal company are particularly concerned with the location and direction of the main attack, since this attack probably will require most of the efforts of the signal company in maintaining adequate communication.

65. ACTIVITIES OF THE SIGNAL OFFICER

a. Planning. To make communication operative without delay, the signal officer constantly plans ahead, maintains close liaison with the staff to gain the earliest possible information of the commander's plans, and issues early warning orders to the signal company. He studies the terrain for command post

locations, axes of communication, and protected routes for wire lines and messengers. He reconnoiters suitable command post locations, which he recommends for major subordinate units and also for the division, when the latter is not prescribed by higher commanders. The details of plans and the extent of signal installations are governed by the time available for detailed planning before the attack.

b. Orders and Instructions. When time permits, the signal officer obtains approval of his plan for communication, completes the detailed signal plan, and issues orders to the signal company. The installation of the communication system is not delayed to await for the detailed attack plan. If any delay is contemplated the signal officer orders the advance party to proceed to the designated location of the command post to start installing the communication system. More detailed orders can be issued as further information of the tactical plan is obtained.

c. Instructions to Subordinate Units. Necessary coordinating instructions on signal matters are communicated to all units. These instructions may be issued at a conference between the communication officers and the signal officer while the latter is on visits of inspection; or they may be sent in messages or issued in the signal annex to the division attack order. These instructions may concern messenger service, use of radio, location of signal supply points, coordination of the wire system, and any other information of a coordinating nature. An SOP reduces the volume of such orders.

66. COMMAND POSTS

The depth of advance planned by the commander determines the number of probable command post displacements that will be required. In recommending the specific location for the initial command post for the attack, the signal officer selects a location well forward. The signal officer is prepared to recommend a command post location and an axis of communication for any task force organized by the division.

67. TACTICAL APPLICATION OF COMMUNICATION

a. General. Time and space factors may not permit elaborate communication installations for the attack in a meeting engagement. The same factors may make it difficult to issue signal supplies. Before an attack against an organized position, provisions for greater security and more extensive installations usually are possible. These include—

- (1) Construction of protective shelters for signal installations at initial command posts.
- (2) Laying additional wire.
- (3) Extending the wire axis as far forward as possible before the attack.
- (4) Issuing detailed signal orders and instructions for signal facilities to support the division commander's plan of action.
- (5) Supervising the execution of orders and instructions.

b. Communication Center. Operations of the communication center at the command post may in-

volve displacing the message center from a temporary development location to a more advanced location, and then to the site chosen for operation during combat. Displacement is made by leap-frogging the teams of the command post group. The communication center is always prepared to initiate displacement. The division commander's plan of attack may call for operations requiring the establishment of an advance communication center behind the main effort. If this is set up at a location to which the command post may displace, the time required for installing communication facilities when the command post displaces will be materially reduced. The personnel of the advance communication center come from the advance party.

c. Messengers. After the attack has been launched, special messengers are normally used forward of the division command post. In a meeting engagement, pigeons are used as on a march. In an attack on an organized position, particularly when the division is operating as part of a larger force, corps headquarters usually delivers baskets of pigeons for distribution within the division.

d. Radio Communication. When surprise is important, operation of radio stations is limited initially to those units in contact with the enemy. The operation of dummy stations, under orders from higher commanders, may increase deception and surprise. If the division is moving into an area for participation in the attack, it maintains radio silence until the attack is launched. If the division is already occupying a sector of a stabilized area, it continues normal radio operation before the attack. If moved

to a flank or relieved by another unit, the division may provide dummy stations to continue normal operation until the attack is launched. When the attack is launched, all restrictions on radio operation are removed. (Fig. 5.)

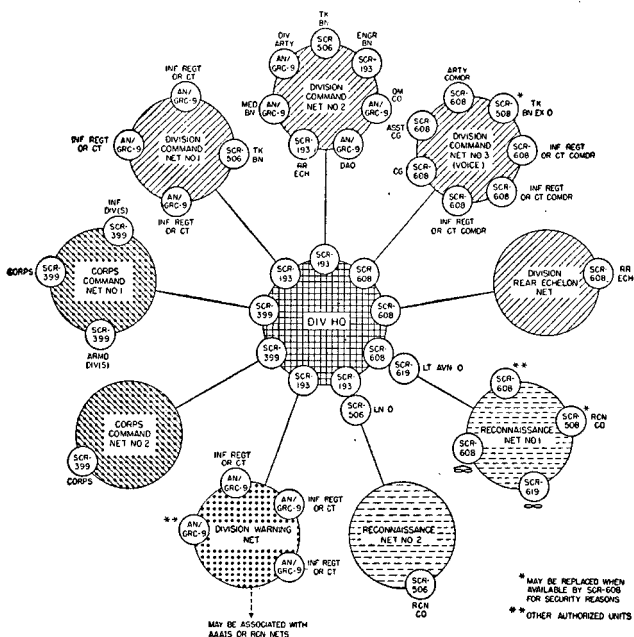


Figure 5. *Type radio nets for an infantry division.*

e. Dropped Messages. Drop and pick-up message points are located to prevent danger to the airplane from artillery fire.

f. Wire Communication. In a meeting engagement, the initial wire system includes only minimum essential circuits. In an attack against an organized

position the wire system is more extensive than in other attack operations. The extent of the system is limited by time and the amount of wire available. Normally, the number of circuits to units and establishments and the number of telephones at the command post are increased. Teletypewriter service to the rear echelon and to adjacent and higher headquarters is established. The type and extent of protective shelters constructed for signal installations at the command post is governed by the available time. Radio relay teams are assigned to units according to needs established during the planning phase.

68. SIGNAL SUPPLY

Signal supplies can seldom be distributed during a meeting engagement. In attacks such as those against organized positions, signal supplies can be distributed with units drawing their supplies from the division signal supply point. The stocks of signal supplies are maintained at an effective level by the signal supply group of the signal company.

Section VI. COMMUNICATION DURING REORGANIZATION

69. GENERAL

When an attack has reached its objective or has been unsuccessful, the division commander decides to renew the attack, defend, or withdraw. If the attack is continued, the forces may be regrouped, the scheme of maneuver may be changed, or reinforcements may be brought up. If the decision is to defend, there

may be a reorganization in depth, with changes in the disposition of forces being carried out under concealment of darkness. If the decision is to withdraw, operations may be continued to maintain the defense in place until dark; or, in exceptional circumstances, the withdrawal may be made during daylight. Whichever of these actions is taken, the signal officer is prepared to provide communication. As soon as he is informed of the commander's decision, he directs the signal company to modify and repair the existing communication system to support the new actions. Command posts may be displaced, additional wire circuits are provided to some units, existing supplementary facilities are used, new test stations may be installed, and advance message centers may be established.

70. COMMAND POSTS

a. If the decision is made to renew the attack, the command post is moved, time permitting, to the most suitable position for controlling the new attack. The same factors are considered for the new location as were considered when the command post site was selected for the initial attack. In an attack to be resumed immediately, the command post is not moved until the attack is under way or until the first objective is captured.

b. When a defense in the position then occupied is decided, the command post is moved to the most favorable location for the defense.

c. Upon a decision to withdraw, the command post is left in its existing location and plans are pre-

pared for the withdrawal. A new command post site is selected to the rear, and communication facilities are established before the withdrawal. The old command post is closed when the new command post opens.

71. TACTICAL APPLICATION OF COMMUNICATION

Radio communication is changed as little as possible during reorganization. Any change at this time, especially in the amount and type of traffic, gives an alert enemy much desirable information. Wire systems are installed or changed to meet the new situation.

72. SIGNAL SUPPLY

During the reorganization is an excellent time to replace batteries and repair or exchange equipment. Wire teams replenish their gasoline and wire supplies. Extra wire is furnished to all combat units that need it. Every effort is made to provide all echelons with the items they will need for contemplated operations.

Section VII. COMMUNICATION DURING PURSUIT

73. GENERAL

When an enemy is forced to retreat, an immediate and relentless pursuit is launched to exploit the initial success. During a pursuit all arms and units are

pushed to the extreme limit of physical endurance. Direct pressure against the retreating forces is combined with an enveloping or encircling maneuver to place troops across the enemy's lines of retreat. Maintenance of communication during the pursuit requires maximum effort on the part of signal troops.

74. TACTICAL APPLICATION OF COMMUNICATION

a. General. The speed of a vigorous pursuit necessitates rapid and numerous displacements of the command post. This requires continuous message center operation by all message center teams of the command post group. It may be advisable to establish an advance message center on the route followed by the encircling force, and it may be necessary to detail a message center team from the signal company to accompany the encircling force.

b. Messengers. All available messengers are used at established message centers. When distances are materially increased between a division and its rear elements, as many messengers as possible are stationed at relay points. Aircraft for drop and pick-up service are desirable during the pursuit. Pigeons may be helpful to the encircling force.

c. Radio Communication. Radio is the most suitable means of communication for the encircling force and for similar forces moving at great distances from the division command post. The distance between these forces and the command post may become so great that the most powerful sets available in the

division have to be used. This necessitates assigning signal company radio sets to these forces, and installing a radio set of comparable power at the command post. Radio silence may be necessary to keep the movements of pursuing and encircling forces secret from the enemy. Radio operation within and between units of the direct-pressure force is governed by the same considerations as those which govern its operation in the attack.

d. Visual Communication. Panels are used to identify pursuing or flanking forces to friendly aircraft. Communication by panels may be used between light aircraft and the division message center and major pursuing elements.

e. Dropped Messages. Drop and pick-up messages can be used during the pursuit with the same limitations as during the attack.

f. Wire Communication. The rapidity of pursuit does not permit the construction of normal wire circuits. Existing facilities along the routes of pursuit are used if they are serviceable or easily repairable.

75. SIGNAL SUPPLY

Plans of the signal officer include provision for the supply of any attached forces used for pursuit and arrangement for distribution of supplies to the forces before the start of the pursuit. Such plans also include an examination of the feasibility of air drops or air transport of supplies.

Section VIII. COMMUNICATION DURING DEFENSE

76. GENERAL

The time available to organize a position usually determines the extent of the signal installations in a defensive operation. When a division assumes the defensive in a meeting engagement, communication is normally provided by these means used on the march. These may be supplemented by hastily constructed wire circuits. When sufficient time is available for complete organization of the ground, channels of communication are increased and alternate channels are provided. The wire system is expanded, decreasing the necessity for the use of radio and messengers before an attack by hostile forces.

77. COMMAND POSTS

The enemy makes every effort to disrupt command and communication installations by using tank, artillery, combat aviation, and airborne attacks. In recommending command post locations, the signal officer considers the factors governing the location of command posts as listed in paragraph 19. He also considers the establishment of communication facilities at alternate command post locations. In a defensive action, command posts are located far enough forward to facilitate control of units, to secure protection by these units against enemy attacks, and to reduce the possibility that such attacks may isolate them from the troops they control. Plans are made to avoid disclosure of the locations of new command

posts and signal installations. Plans prepared for the employment of the division reserve include possible locations for the reserve command post. These plans are flexible to meet possible changes in the tactical situation. The signal officer provides for the installation of the communication facilities required by these plans.

78. TACTICAL APPLICATION OF COMMUNICATION

a. General.

- (1) The division communication system provides communication to the division units, to covering forces and division outposts, and to other units and establishments requiring it. These include the division reserve, division observation posts, advance division landing fields, attached troops, supply and evacuation establishments, and all echelons of division headquarters. If considerable time is spent in a given position, alternate command posts and wire lines are installed.
- (2) The signal officer continually studies the communication system to locate weaknesses and overloaded facilities and prepares plans to meet emergencies. He makes inspections to insure that instructions are being correctly interpreted and prepares plans for later phases of the defense. He obtains early information about major changes in the tactical situation and in the commander's plans.

b. Communication Center. The communication center is not normally required to move when the division is engaged in defensive operations; however, communication center personnel are prepared to displace at any time. If advance communication centers or alternate command posts are established, teams from the advance party of the command post group are assigned to provide communication at such locations.

c. Messengers.

- (1) Special messengers are required during the occupation and organization of a defensive position. When the position has become stabilized, only scheduled messenger service is used between the division command post and its rear echelon, or the command posts of its major units, unless other communication means are interrupted by enemy attack. If other means are disrupted, it may become necessary to use special messengers freely for numerous types of missions.
- (2) The use of *pigeons* in defense is limited to a few special situations. They may be used—
 - (a) In terrain, such as mountainous areas, where establishment and maintenance of wire and radio communication is not practical.
 - (b) When there is an enemy penetration and interruption of other communication means. Pigeons are distributed when troops go into position and arrangements are made for their regular replacement.

d. Radio Communication. The use of radio is normally minimized for security reasons when adequate wire communication and messenger service are available. Radio nets remain open for use if wire communication is interrupted or becomes inadequate. It may be necessary for the reconnaissance net to operate so that the division commander can obtain information about enemy operations and troop disposition from reconnaissance units.

e. Visual Communication.

- (1) *Lamps*, including flashlights, may be used from forward observation posts to rear installations.
- (2) A *panel* station, if established, should be near the division radio station.
- (3) *Pyrotechnics* are seldom used by the signal company. They may be used to advantage by smaller combat units as a means of transmitting prearranged messages.

f. Wire Communication. During defensive operations, the wire system is as extensive as time and facilities permit.

- (1) When contact with the enemy is imminent, the wire system is constructed rapidly to meet the immediate requirements of the situation. If contact is remote or improbable or if the situation has become stabilized, the wire system is more extensive and better constructed. The number of circuits to major subordinate units is increased as time and tactical circumstances permit. Additional wire facilities (teletypewriter) may be installed. Provisions are made for al-

ternate wire routes. Telephones at command posts may be increased in number. When a pigeon loft is located in the division area, a local line is laid to it.

- (2) In static defensive situations, lateral trunk lines are installed between units down to battalions. Wire teams for construction of laterals may be furnished by the adjacent units to be connected or by the next higher unit, depending upon the over-all priority of the work to be done and the availability of wire teams. In the absence of orders, wire communication is established between adjacent units from left to right. (Par. 5.) A type wire system for a division in defense is shown in figure 6.

79. SIGNAL SUPPLY

A stock of signal supplies is maintained during the defensive, and all shortages and depleted stocks are replenished as promptly as possible.

80. COMMUNICATION IN COUNTEROFFENSIVE

The period of transition from the defensive to the offensive is critical for the communication system. New forward locations are selected for command posts. During the counteroffensive, the various means of communication are used in much the same way as they are in an attack. The signal officer replaces wire and other expended signal supplies.

Communication security methods are enforced to prevent the enemy from obtaining information of the counteroffensive.

Section IX. COMMUNICATION DURING RETROGRADE MOVEMENTS

81. COMMUNICATION IN WITHDRAWAL FROM ACTION

a. General.

- (1) Unless withdrawal in daylight is unavoidable, withdrawal of the greater part of the force usually is conducted under cover of darkness, with only weak elements left in immediate contact with the enemy. The withdrawal normally is executed on a broad front; troops retire initially in small columns and assemble into larger units at designated assembly areas (FM 100-5).
- (2) The division signal officer seeks early information regarding zones and routes of withdrawal of units, strength and operations of security forces, priority in withdrawal, and steps to clear the withdrawal routes. While the withdrawal plan is being formulated, he may be called upon to recommend the axes of communication of division and major subordinate units. In making these recommendations, he considers the location of existing wire lines. Effective use of these lines materially increases

the efficiency with which wire communication can be maintained during a withdrawal.

b. Communication Plans.

- (1) Having obtained information of the plan of withdrawal, the signal officer plans for the communication system to be used during the operation. His plans include—
 - (a) Regulation of radio operation, including the use of dummy stations in maintaining the normal level of traffic in the old position.
 - (b) The most effective possible use of all wire circuits employed in the defense, to reduce the amount of new wire construction required by the withdrawing force.
 - (c) The retention of a part of the defensive wire system for communication between and within the elements of the division left in contact with the enemy.
- (2) If plans provide for a withdrawal to another defensive position, the signal officer prepares to begin installation of the communication system at the new position as early as practicable.

c. Signal Company Activity During Withdrawal.

The signal company continues operation of the communication system, prepares for rearward displacement of the command post, and initiates construction of such additional wire circuits as are necessary for the withdrawal. In general, wire circuits are held to a minimum, both in numbers and in length.

Since the defensive wire system is normally extensive, existing circuits are usually available near the assembly area of each withdrawing unit. These circuits may be spliced to new circuits constructed to assembly areas. As units withdraw, wire lines not required by these units or by elements left in contact with the enemy are recovered if such recovery does not dangerously delay the withdrawal of signal personnel and equipment. Wire lines that cannot be recovered are destroyed.

d. Radio Communication. Radio silence may be enforced on the move and in the new location until danger of hostile discovery is past.

e. Messengers. During the period between the initiation of the withdrawal and the formation of march columns, the need for special messengers is increased. Advance communication centers are established and special messengers are assigned to each. After rearward displacement of the command post and when it will facilitate communication with elements left in contact with the enemy, the old command post is designated as an advance communication center. Pigeons distributed to units before the withdrawal may be used to report periodically the position of withdrawing units to division headquarters, provided the lofts to which the birds fly are located in areas from which withdrawal is not imminent. Pigeons not so employed are returned to the lofts in their containers. During a withdrawal, all signal equipment which cannot be dismantled and moved to the rear in time to prevent capture by the enemy is destroyed or otherwise rendered useless.

82. COMMUNICATION IN DELAYING ACTION

Delaying action permits limited resistance in a defensive position. This both retards the enemy's progress and gains time. Timely measures are taken for signal reconnaissance and for preparations necessary to establish communication at successive delaying positions, when such positions are used. Each of these installations is comparable to the initial system for an attack in a meeting engagement.

CHAPTER 3

SIGNAL COMPANY, AIRBORNE DIVISION

Section I. GENERAL

83. ORGANIZATION

The organization of the airborne division signal company is similar to that of the infantry division signal company (fig. 1). Minor difference can be noted in comparing the tables of organization and equipment of the two units. The functions of the various elements of the airborne division signal company are also similar to those in the infantry division signal company (ch. 2).

84. PHASES OF AIRBORNE OPERATIONS

This chapter deals only with those aspects of communication peculiar to airborne operations. These may be grouped into the following phases:

- a.* Planning communication for an airborne operation.
- b.* Communication during marshalling.
- c.* Communication during air movement.
- d.* Communication during assault.
- e.* Communication during sustained combat.
- f.* Communication at base camps during operations.

Other operations of the airborne division signal company are similar to those explained in chapter 2.

85. PLANNING COMMUNICATION FOR AN AIRBORNE OPERATION

a. General. In planning the employment of communication facilities, the signal officer considers that once the airborne operation has commenced, changes in plans or execution will be difficult. Alternate plans of action must be known sufficiently in advance to permit rearrangement of communication personnel in various aircraft and serials in such way that they can effectively accomplish their missions in the execution of alternate plans. When the necessary personnel of the airborne division signal company have been landed in the objective area, their functions are similar to those of the personnel of an infantry division signal company. The principal differences are due to limitations in the number of personnel, the amount and types of signal equipment, and the amount of motor transportation that can be carried by available aircraft.

b. Responsibility for Communication. During this phase the division is in an assembly area. It is responsible for its own internal communication and either installs its own equipment or uses equipment provided by communications zone. The division operates its own communication center. Before moving to the marshalling area, equipment to be used during the assault is inspected and packaged. Thereafter, communications zone is responsible for furnishing and maintaining all necessary facilities other

than those maintained for internal communication in the division (par. 50).

c. Communication Requirements. To determine the requirements for each of the signal activities and to plan the communication system to meet these requirements it is necessary to know—

- (1) The disposition of the units engaged in airborne operations in the departure areas and in the airhead.
- (2) The tactical employment of units during the execution of their mission.
- (3) The necessary coordination with other ground and air force elements during operations.

d. Mission of Airborne Division Signal Company. The mission of the airborne division signal company is to furnish necessary channels of communication, including—

- (1) Installation, operation, and maintenance of a communication system at the rear base.
- (2) Establishment of direct radio contact from the rear echelon to the combat echelon and arranging for as many alternate means of communication as possible with the equipment provided.
- (3) Maintenance of a complete communication system in the combat echelon.
- (4) Maintenance of communication between the combat echelon and tactical air-control parties and other supporting or cooperating units in the airhead.

e. Joint Communication. Joint communication comprises all those means required to link ground,

naval, and air elements of an attacking force before and during the actual airborne operation.

f. Communication Difficulties. Communication difficulties inherent in airborne operations are due to—

- (1) The joint nature of the operation.
- (2) Necessity for great dependence on radio.
- (3) Circular development of an airhead.
- (4) Limitations as to the availability of transportation.
- (5) Dispersion of personnel and equipment on landing.

Section II. COMMUNICATION DURING MARSHALLING AND AIR MOVEMENT

86. COMMUNICATION DURING MARSHALLING

a. During this phase, the assault elements of the division are located in marshalling camps near the departure airfields. Personnel are briefed on the operation, equipment is checked, and aircraft are loaded. The division may operate a small message center to expedite the transmission of messages between the division commander, lower unit commanders, and troop-carrier forces.

b. Communication during marshalling is primarily over facilities provided by the communications zone and the air force base commander. These facilities include radio, wire (telephone and teletype), and message center and messenger service. Communications zone may install wire communication between

marshalling camps. Telephone, teletype, and auxiliary radio channels are maintained between the rear echelon of the division headquarters in the base camp and the temporary division headquarters in the marshalling area. Close liaison is maintained between message centers of the division and those operated by troop-carrier forces supporting the operation.

c. Communication facilities in this phase are maintained until all elements of the airborne force have been moved from the marshalling area.

87. COMMUNICATION DURING AIR MOVEMENT

During the air movement phase, airborne forces are passengers. Any communication to, from, or between them is under joint air force-airborne force direction and routed via air force communication channels. Normally, radio silence is maintained during this period.

Section III. COMMUNICATION DURING ASSAULT

88. GENERAL

During this phase, the division lands by parachute and glider or assault aircraft, assembles, reorganizes, seizes objectives, and secures the airhead. Communication necessary to assist in assembly and in gaining control of the division is established. In addition to the final requirement of being comparable to communication for ground forces, airborne communication involves missions peculiar to airborne operations

requiring highly trained personnel and special equipment capable of delivery by parachute and glider or assault aircraft. These missions are—

a. Pathfinder missions.

b. Individual and small unit communication to assist in the assembly of units.

c. Immediate establishment of command and fire control channels within the airborne forces.

d. Communication with supporting aviation and naval forces.

e. Communication to distant bases in friendly territory.

f. Communication to widely separated airborne or ground forces with common or coordinated missions.

89. PATHFINDERS

Pathfinder teams use electronic and visual aids to assist in guiding air formations to predesignated drop and glider-landing zones. These teams precede the first serial of the main effort at a time agreed upon by airborne and air commanders.

90. ASSEMBLY AIDS

Assembly aids are employed to allow each commander to regain control of his command at the earliest possible time after the landing of his unit and to make timely contact with other units involved. These aids may include direction-finding radio equipment; subsonic, sonic, and supersonic signals; visual signals; infrared devices; and other devices under current research and development.

91. ORGANIC AND ATTACHED COMMUNICATION CHANNELS

a. Organic Communication. The immediate establishment of channels of communication as assault elements arrive in the objective area is essential. Initial communication in the objective area is provided by radio. Communication center personnel are included in the serial in which the command echelon moves. Special messenger service is provided at each level of command, and messengers are dispatched to next higher headquarters in the objective area immediately after establishment of command posts. Radio nets (fig. 7) normally established are—

- (1) Commander's net.
- (2) Command nets.
- (3) Communication with troop-carrier forces.
- (4) Air request net.
- (5) Reconnaissance net.
- (6) Radio channels to higher and supporting echelons.
- (7) Radio channels to the airborne rear base.

b. Attached Communication Facilities.

- (1) Normally thirteen tactical air control parties are required; one for each battalion, one for each regiment, and one for division headquarters. These parties are used initially for calling for air strikes and for controlling close support aircraft assigned missions in support of the airborne division. They have organic equipment for communication with aircraft in flight and with the

Tactical Air Direction Center assigning aircraft to the support of the airborne division.

- (2) Troop carrier combat control teams of air force personnel normally are sent into the objective area with the airborne division to obtain information of the airhead area on such factors as weather or landing and drop zones which will affect the operations of the troop carrier aircraft. These teams are equipped to communicate with the headquarters of the troop carrier unit providing the lift for the airborne division as well as with the troop carrier aircraft in flight. The communication channels established by these teams may be used as alternate channels to the rear by the airborne division.
- (3) Other attachments which may be made are—
 - (a) Additional radio teams of a long range or special type.
 - (b) Naval gunfire liaison parties.
 - (c) Advance landing field parties.
 - (d) Additional wire construction teams from corps signal battalion.
 - (e) Army security agency detachment.

92. EXTRA SIGNAL EQUIPMENT

Since airborne forces are dispersed upon landing, sufficient personnel and equipment from the airborne division signal company are included in the initial serials to insure the timely installation of communi-

cation facilities. To fulfill the communication mission it is necessary to include spare items of major signal equipment.

93. WIRE

During the assault, wire is initially a supplementary means of communication. The use of wire is influenced by the intensity of the build-up and depends upon the neutralization of enemy resistance between drop and landing zones. Wire facilities are expanded as equipment and signal troops are landed until a complete wire system, similar to that of a ground unit of comparable size, is installed.

94. COMMUNICATION AFTER CONSOLIDATION

After consolidation of the airhead or link-up with advancing ground units, the communication system of an airborne division is similar to that of an infantry division.

Section IV. COMMUNICATION DURING SUSTAINED COMBAT AND AT BASE CAMPS

95. COMMUNICATION DURING SUSTAINED COMBAT

The airborne division is prepared to assume ground roles. The communication system during sustained combat is the same as that in an infantry division (ch. 2).

96. COMMUNICATION AT BASE CAMPS DURING OPERATIONS

a. Adequate communication facilities are required at the airborne division's base camps until they are closed. During the build-up of an airborne operation and the delivery of supplies to the airhead by air, direct radio, telephone, and teletype communication channels are established between the division rear echelon and the headquarters directing the airborne operation, the troop-carrier headquarters, supply installations, major airborne units not yet committed, and necessary headquarters and installations in the rear area. These communication channels are maintained until the airborne division comes under complete control of the ground commander in the combat zone.

b. Maintenance detachments remaining in the base camps until the division returns or until the base camps are closed are provided with the minimum communication essential for administration. Existing wire systems are used and messenger service is established.

Section V. SIGNAL SUPPLY

97. GENERAL

Except during the marshalling and assault phases of an airborne operation, signal supply in an airborne division is handled in the same manner as in an infantry division (ch. 2). Before arrival in the marshalling area, sufficient supplies are distributed for normal use and to withstand the abnormal losses

encountered in an airborne assault. These supplies land with the assault elements.

98. PLANS FOR RESUPPLY

Before an airborne operation, plans are prepared for *unit air supply* to be delivered directly to assault units of the airborne division for use before *replenishment supply* is available. Normally, unit air supply is packaged to correspond to anticipated daily requirements. It includes items whose normal rate of expenditure can be readily calculated. This supply is delivered automatically according to the division supply schedule. Provisions are made that permit flexibility in the composition of daily requirements. Unit air supply also includes items whose expenditure cannot be accurately estimated. Such items are packaged for delivery by air and placed on call. They are delivered only on request of assault units in the airhead. The method of delivery and space allocation are prescribed by the division G-4. Delivery of unit air supply may be by free drop, parachute, glider, or powered aircraft, depending upon the terrain and the progress of the initial assault. For further information on supply in airborne operations, see FM 100-5.

CHAPTER 4

DIVISION ARTILLERY

Section I. GENERAL

99. ORGANIZATION

The division artillery of an infantry division is organized as shown in figure 8.

a. Division Artillery. The communication platoon of the division artillery headquarters battery is composed of a platoon headquarters, a wire section, and a radio (rad) section. It is led by the assistant communication officer, and it installs and maintains the communication system of division artillery headquarters.

b. Field Artillery Battalions. The organization of the headquarters batteries of the field artillery battalions is similar to that of the division artillery headquarters battery. A communication platoon, consisting of a platoon headquarters, a wire section, and a radio (rad) section, is responsible for the communication requirements of the battalion headquarters. It is led by the battalion assistant communication officer. Division artillery 105-mm howitzer battalions have, in addition, countermortar sections equipped with radar and limited communication equipment. The personnel of the liaison sections may assist the battalion wire teams in installing and

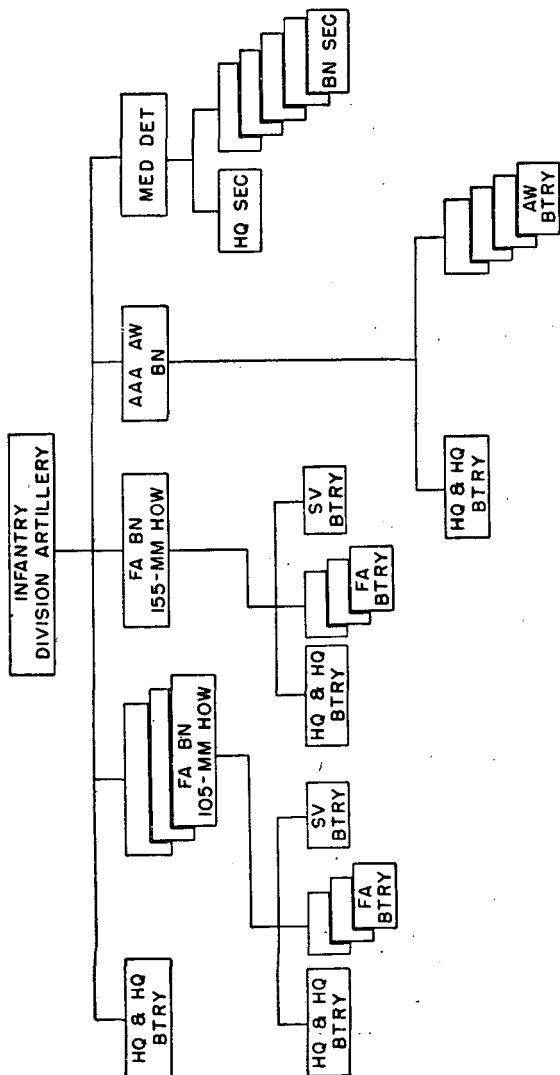


Figure 8. Organization of the infantry division artillery.

maintaining the wire circuits from the battalion to the liaison officers.

c. Firing Battery. The communication requirements of the howitzer firing battery are handled by the communication personnel of the battery detail. The forward observer sections are equipped to install short wire lines; they may be assisted by the battalion liaison sections.

d. Antiaircraft Artillery Automatic Weapons Battalion (SP). The communication section of the headquarters battery of the AAA automatic weapons battalion (SP) handles the communication requirements of the battalion and battery headquarters. It is led by the communication chief who assists the battalion communication officer. Each lettered battery of the automatic weapons battalion (SP) contains a communication section led by a communication sergeant. This section is in the battery headquarters and handles the communication requirements of the battery.

e. Army Aviation. Division artillery headquarters battery and each field artillery battalion headquarters battery contain an aviation section. The unit communication officer supervises the communication installations of this section.

f. Communication Officer. The communication officer for field artillery battalions, the organic anti-aircraft artillery automatic weapons battalion (SP), and the division artillery headquarters is a special staff officer on the commander's staff. He accompanies the commander on reconnaissance and advises him of suitability of location of the command post from a communication standpoint.

100. COMMUNICATION REQUIREMENTS AND PRINCIPLES

Artillery communication systems are designed to facilitate the functions of command, liaison, fire control, information and intelligence, and administration.

a. Liaison is the contact maintained between units to secure coordination of activities. Command liaison is accomplished by direct conference between artillery and supported unit commanders. Artillery liaison officers maintain liaison with supported infantry regiments, infantry battalions, and tank battalions. Artillery observers maintain contact with supported infantry and tank companies. The communication system of an artillery unit provides facilities for the accomplishment of these functions.

b. Fire-control facilities between artillery observers (ground, air, and radar units), liaison personnel, fire-direction centers, and firing batteries are installed and maintained by the artillery.

c. Information and intelligence are gathered by field artillery units through liaison and fire-control communication facilities. In antiaircraft artillery units, this function is accomplished by an extensive antiaircraft artillery intelligence service (AAAIS). A local aircraft warning service is provided by the antiaircraft artillery automatic weapons battalion observation posts.

d. Administration of artillery echelons is facilitated by the communication system of the artillery. Messenger service, radio, and telephone are used for this function.

101. COMMAND POSTS

a. Each command post of the division artillery and the artillery battalions consists of a headquarters (commander or his representative and appropriate staff sections), a message center, a fire-direction center, a switching central, and a radio and panel station. A typical division artillery command post communication installation is shown in figure 9; one for an artillery battalion is shown in figure 10.

b. The division artillery command post usually is centrally located with respect to the division artillery battalions to facilitate control of these battalions. The command post of a direct support artillery battalion is selected primarily for ease of control of its batteries; a location near the command post of the supported infantry regiment is desirable. Ordinarily, the infantry command post displaces twice while the direct support artillery command post displaces once. The supporting artillery maintains communication with the supported infantry using all available means.

102. WIRE COMMUNICATION

a. General. Wire circuits are installed by artillery units during operations unless orders are issued to the contrary. The initial wire system depends upon the immediate needs of the commander, the time required to make the installations, the availability of equipment, and the expected future needs of available wire supplies. Reconnaissance precedes installation. Wire personnel begin installation as

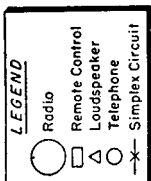


Figure 10. Type command post communication installation, 105-mm howitzer battalion, infantry division.

early as possible so that essential circuits are ready for use when needed.

b. Simplexed Circuits. Simplexed circuits or alternate circuits are used extensively by artillery units. Simplex circuits between fire-direction centers, and between battalion fire-direction centers and howitzer batteries, are employed for the conduct of fire. The wire circuit to the command post of an infantry regiment is simplexed for use by the artillery liaison officer.

c. Howitzer Battery Wire System. The wire system usually installed by a battery is shown in figure 11. Usually batteries install the trunk circuits to battalion as well as the direct circuits between the battery executive and the computer at the battalion fire-direction center. In fast-moving situations, the battalion commander may limit the wire installations to essential fire-direction circuits; in other situations he may prescribe additional or duplication of critical circuits.

d. Battalion Wire System. Typical wire installations of a field artillery battalion are indicated in figure 11. Liaison officers extend their lines as they move forward. One wire circuit is installed to the switchboard of the infantry regiment or reinforced unit. Additional circuits to the infantry are installed when necessary for adequate coordination between commanders and staffs. Liaison section circuits are installed by the artillery battalion communication personnel to the liaison officer's switchboard. Forward observers maintain communication to their respective liaison officers through the liaison officers' switchboards. Type wire installations of the coun-

termortar section are indicated in figure 11. The liaison officer with the supported regiment has direct communication with the fire-direction center by means of a simplexed circuit from the infantry regiment. A telephone circuit may also be installed to the command post of the antiaircraft artillery unit providing air defense.

e. Division Artillery Wire System. Typical wire installations of division artillery are shown in figure 12. Division artillery wire personnel install the circuits to organic and attached battalions. Division signal personnel install two circuits to the division artillery switchboard. Corps artillery circuits are installed by corps artillery communication personnel.

f. Displacement. When a displacement is necessary, a wire system is established in the new position before the first elements arrive. The extent of the wire system installed depends on the time and equipment available to make the installation. Reconnaissance parties include vehicles, personnel, and equipment to plan and install the wire system. Sufficient personnel, vehicles, and equipment remain in the old position to operate the installed system and to recover the wire and equipment when that system is closed. It is desirable to have wire communication between the old and new positions during displacement. In forward displacements, this is best accomplished by employing existing forward circuits. In a retrograde movement, it is often possible to use lines previously laid by the unit, which have not been recovered, or lines turned over by a higher artillery echelon.

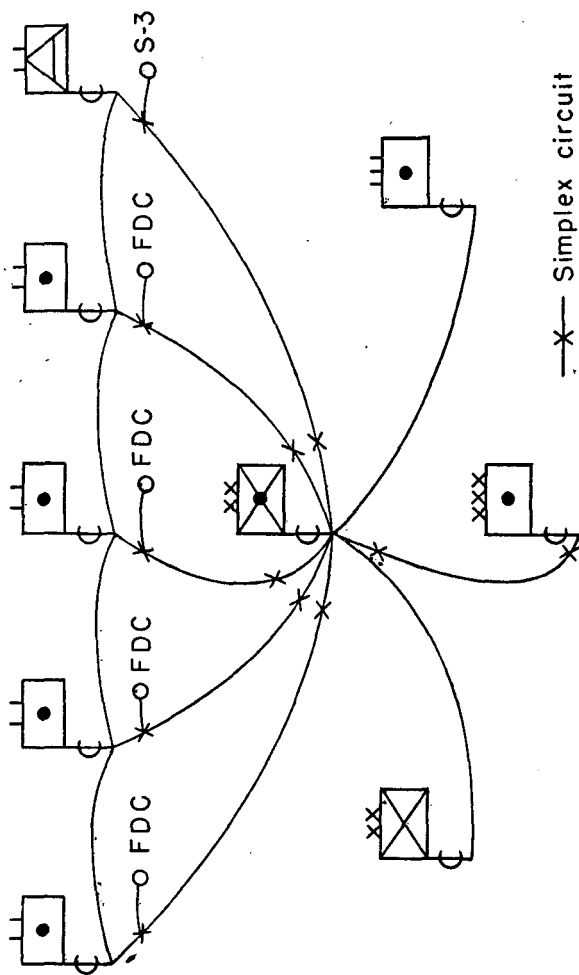


Figure 12. Type wire system, infantry division artillery.

103. RADIO COMMUNICATION

a. General. Radio communication is established by artillery units as either a principal or a supplementary means of communication. The flexibility of radio provides artillery commanders with facilities for—

- (1) Command of subordinate units.
- (2) Observation and reconnaissance.
- (3) Fire direction.
- (4) Survey.
- (5) Liaison.
- (6) Administration.
- (7) Communication with higher, adjacent, and supported units.
- (8) Air warning.

b. Channel Assignment.

- (1) Division artillery is assigned three frequency-modulated channels—one for tactical control of battalions, one for fire-direction purposes; and one for coordination of the radar sections of the three direct support battalions.
- (2) Although tactical requirements may limit the allocation of frequency-modulated channels to two for each artillery battalion, it is desirable that direct support battalions be given four channels. Three of these are used for fire-direction—one clear channel per firing battery—and the fourth is used for tactical control of the battalion as well as an alternate fire-direction channel.

- (3) The general support field artillery battalion normally is assigned two frequency-modulated channels—one for tactical control within the battalion and one for fire-direction purposes.
- (4) The organic AAA AW battalion of the division artillery is assigned five frequency-modulated channels. One channel is used by the battalion headquarters for command and one channel is used by each of four automatic weapons batteries for a command and radar reporting channel. When operating with a surface mission, this battalion establishes communication with the infantry battalion.
- (5) On administrative marches or during displacement as a unit, all stations in each battalion operate on the control channel and switch to respective fire-direction channels on order of the net control station. When displacement is by echelon, they continue to operate on their normally assigned channels or as directed by the battalion commander.

c. Amplitude-modulated radio sets operate on frequencies assigned in the division SOI.

d. Typical radio nets operated within the division artillery are shown in figures 13 to 17.

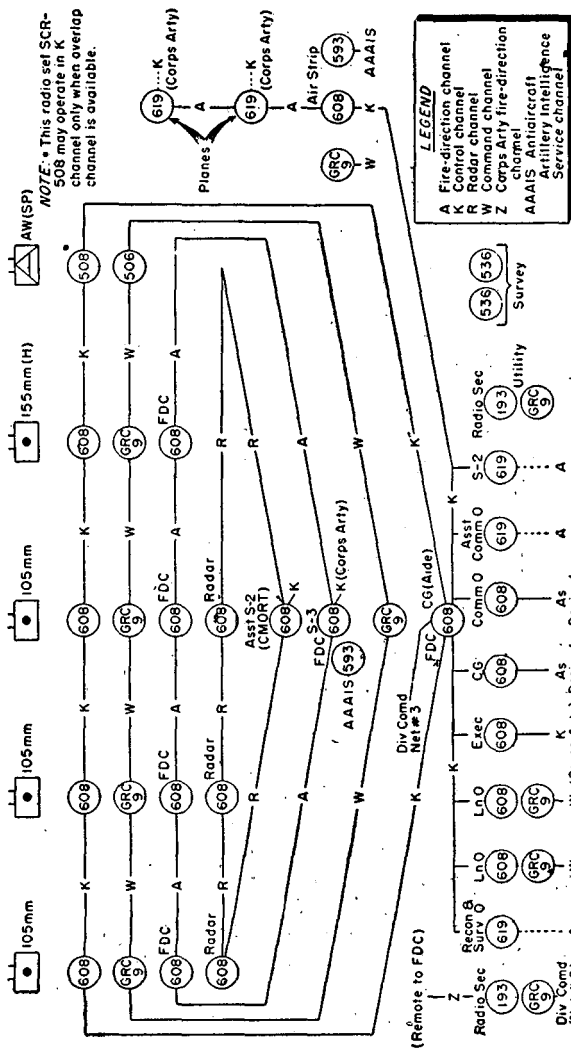


Figure 13. Type radio system, infantry division artillery.

Figure 14. Type radio system, 105-mm howitzer battalion, infantry division.

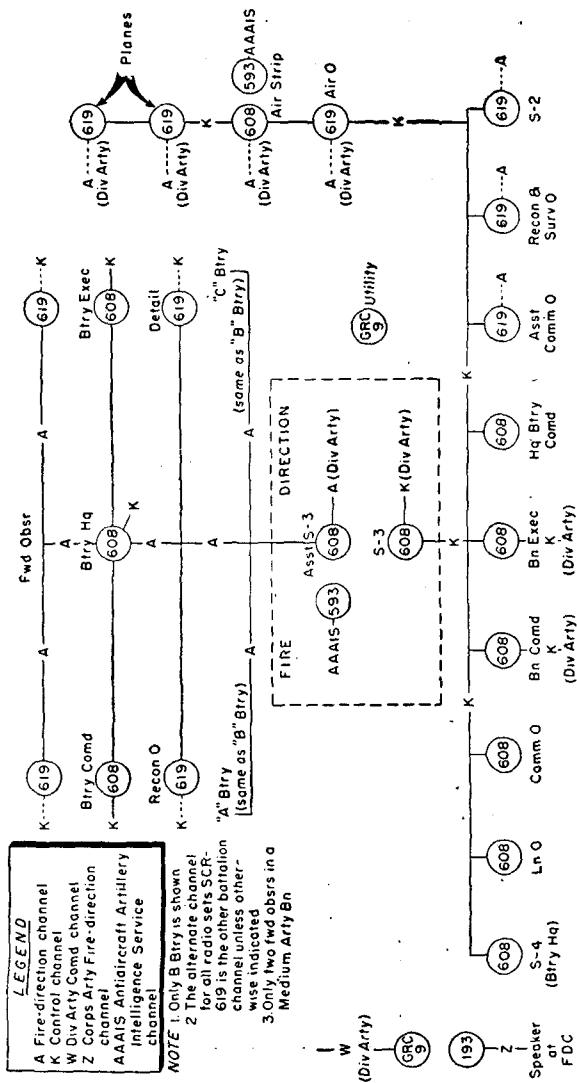


Figure 15. Type radio system, 155-mm howitzer battalion, infantry division.

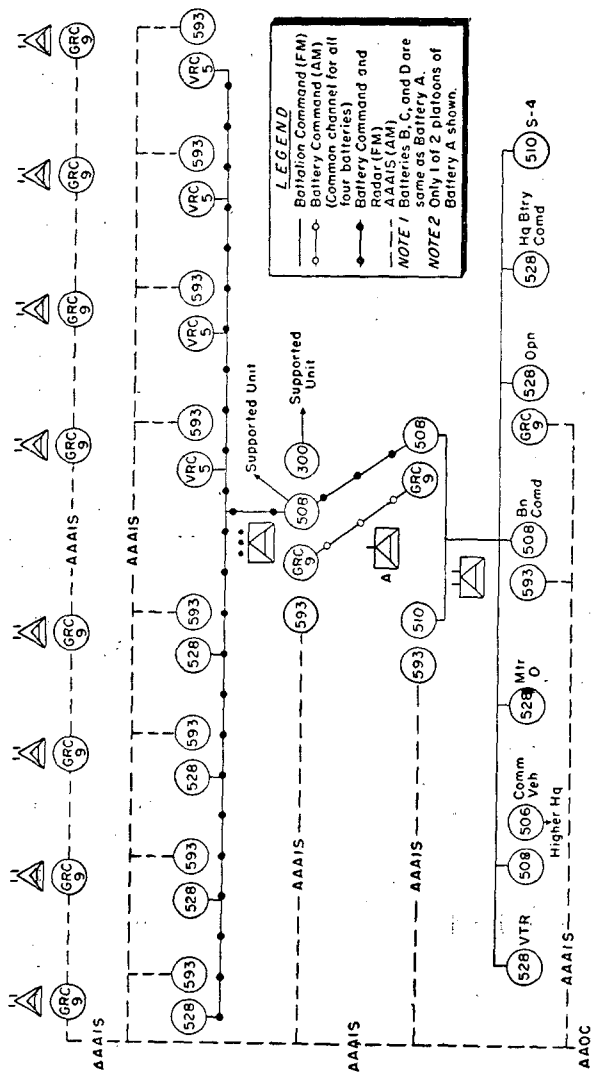


Figure 16. Type radio system, AAA AW battalion (SP), infantry division.

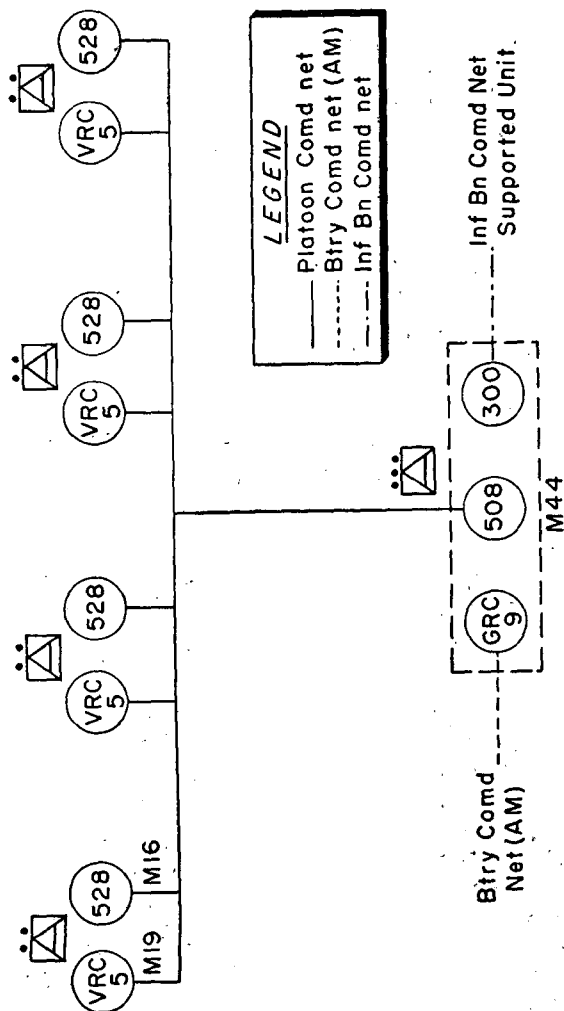


Figure 17. Type radio system, AAA AW battalion (SP), infantry division, with a surface mission.

Section II. COMMUNICATION DURING A CONCENTRATION

104. GENERAL

During the concentration period, a commander plans and prepares for contemplated or scheduled operations. All echelons receive information concerning contemplated operations and prepare their plans accordingly. Staff conferences are held for coordination of effort. Command posts are located so that communication and personnel requirements for their operation are kept to a minimum.

105. TACTICAL APPLICATION OF COMMUNICATION

a. Message centers are established and operated by each headquarters. Messengers are stationed at each message center and scheduled messenger service may be provided if the volume of traffic warrants its establishment.

b. Wire installations are kept to a minimum within the concentration area. Full use is made of existing commercial wire facilities.

c. Radio stations generally are silenced or restricted except for warning nets established for use in connection with reconnaissance. All radio sets are tuned and tested on channels prescribed by the SOI for the planned operation.

d. All signal equipment is inspected for operating condition and adequacy. Equipment shortages are replenished.

e. Training is continued and intensified. Particular emphasis is placed on requirements for the operation being planned.

f. Prearranged message codes are prepared and distributed.

Section III. COMMUNICATION DURING MARCHES AND HALTS

106. COMMUNICATION DURING MARCHES

a. During marches, communication facilities are used for column control and for maintenance of contact with artillery reconnaissance and security parties and with supported and higher units.

b. A march message center is established by each headquarters in one of the leading vehicles in its column. Normally, messengers are used between march units and within groups and serials of individual march units. To provide adequate messenger service, the march is planned so that messengers can be told the exact time and place to meet any headquarters.

c. Wire communication is generally impracticable.

d. If radio communication is not prohibited for security reasons, each artillery battalion operates on its control channel. All vehicular radios operate on this channel for rapid dissemination of information and orders. Each battalion commander also operates one receiver on the division artillery control channel. Artillery light aircraft and artillery reconnaissance and security parties maintain radio communication with marching columns.

107. COMMUNICATION DURING HALTS

During temporary halts communication is maintained as during the march. The use of messengers and radio (if not restricted) is continued. Wire communication is established if the duration of the halt warrants it.

Section IV. COMMUNICATION DURING THE ATTACK, REORGANIZATION, AND PURSUIT

108. GENERAL

a. When the supported force is developing a situation, the artillery is ready to provide continuous support. Artillery liaison and forward observer sections receive instructions and return to supported units. Meteorological messages, warning orders, and other preparatory information are delivered to the units as rapidly as possible. Registration and fire on targets of opportunity are handled with speed and accuracy. The communication system is developed rapidly to help accomplish these missions.

b. In the initial stages of an engagement, command of the artillery is sometimes decentralized. To give the force commander a mass of fire power with which to influence the action, centralized command is resumed as the situation stabilizes.

109. COMMAND POSTS

Artillery command posts are established for coordination of the entire artillery fire support of the division. Continuous communication is maintained between the command posts of artillery and supported

units. Typical installations may be expanded into a more elaborate system. In the attack of an organized position, time is usually available to permit a more detailed command post installation.

110. DISPLACEMENT OF COMMAND POSTS

a. The method of making a displacement, whether it is in the attack or in a retrograde action in which wire communication is used, follows the general plan indicated in paragraph 101. Regardless of whether displacement is accomplished by echelon or not, every effort must be made to maintain communication with the command post of the supported unit.

b. Since displacement by echelon presents many difficulties, communication plans made before the attack include the possibility that all means of communication other than radio may be temporarily impractical. Ordinarily, displacing echelons of a direct support field artillery battalion can displace using their assigned fire-direction channels. However, if complications arise prohibiting this, they may be netted on the battalion channel. The primary consideration is that communication must be maintained between the forward and rear echelons as well as with the forward observers and liaison officers.

111. TACTICAL APPLICATION OF COMMUNICATION DURING THE ATTACK

The commander prescribes to what extent wire and radio systems of the battalions and division artillery are to be developed in any tactical situation. Initially, communication is by radio and messenger.

Wire communication is provided as rapidly as possible. Although speed is paramount during the development, communication security is vital. Since radio traffic is a source of information to the enemy, radio traffic is held to a minimum. Messages sent by radio are kept brief, and the rules of communication security are observed. Maximum use is made of prearranged messages. See figures 11 and 12 for typical wire systems, and figures 13-15 for typical radio nets.

112. COMMUNICATION DURING REORGANIZATION

a. After an attack has reached its objective or has been stopped short of the objective, the force commander may decide either to continue the attack, to withdraw, or to defend. In any event, forces are regrouped to fit the new scheme of maneuver. Communication systems are reorganized and altered to fit new plans.

b. The reorganization phase is a critical one for artillery communication. Artillery support is continuous to protect the supported units and to assist in stopping counterattacks. Artillery communication officers maintain existing communication systems and are prepared to extend or modify the systems as soon as a new decision is made. Radio nets continue in operation.

c. In preparation for the displacement, communication officers have signal equipment serviced and repaired and assist in the redistribution of signal equipment within units. Salvage of equipment is necessary during the reorganization phase.

113. COMMUNICATION DURING PURSUIT

a. During pursuit, the artillery usually is attached to a unit or element making the pursuit. The communication used by artillery in a pursuit is basically the same regardless of the maneuver used by the pursuing force. However, in any scheme of maneuver during a pursuit, maintenance of communication is more difficult because of speed of the operation and increased distances between units.

b. Rapid movement in a pursuit compels rapid and numerous displacements. Maintenance of contact between units and between a unit's advance and rear command posts requires message center personnel, messengers, other communication personnel, and appropriate signal equipment at each installation.

c. Messengers with transportation are maintained as needed at message centers. Organic artillery aircraft may be used for drop and pick-up service. Radio is used extensively. Division artillery maintains contact with battalions retained under its control. Within battalions, the most suitable means of communication is radio. Rapid and numerous displacements call for continuous radio communication. When a field artillery unit displaces by echelon, the first echelon includes radio sets for communication in command, fire direction, and control radio nets. Panels and pyrotechnics may be used with organic aircraft to maintain contact with artillery used in pursuit missions. During pursuit, every effort is made to maintain wire communication. Battalion wire personnel may maintain a circuit to a forward

switching central; along the axis of signal communication, from which liaison officers and forward observers establish circuits.

Section V. COMMUNICATION DURING DEFENSE

114. GENERAL

a. In a prepared defense, sufficient time is available for the planning and installation of as complete a wire system as is desired. Radio is not used initially, but all nets are established and operators listen in continuously. Wire communication is provided for liaison officers and forward observers. Duplicate circuits should be established between the battalion and liaison switchboards, using different wire routes if possible. Duplicate circuits should be established between the liaison officer's switchboard and each forward observer's telephone. Wire is laid to alternate positions to facilitate early communication if these positions are occupied.

b. Particular attention is given to maintenance and improvement of wire circuits in the planning and installation phases. Wire routes that afford maximum natural cover are selected at the expense of distance. Wire is installed with great care and improvement of the wire system is continuous.

115. LATERAL COMMUNICATION

Lateral circuits should be established between liaison officers to provide lateral coordination and an

alternate circuit for emergencies. Lateral circuits between artillery battalions and batteries normally are established. Lateral circuits may even be installed between adjacent forward observers. Permission to use commercial or other circuits, already in existence, is obtained from the division signal officer.

Section VI. COMMUNICATION DURING RETROGRADE MOVEMENTS

116. GENERAL

Communication procedures during retrograde movements generally are similar to those used in forward displacements. The division artillery communication officer obtains early information regarding routes of withdrawal upon which he bases the communication plan.

117. PLANNING COMMUNICATION

The communication officer is prepared to recommend the use of existing wire circuits to increase the efficiency of communication during the withdrawal. Upon receipt of information on the plan of withdrawal, plans for the communication system to be used by the units of the division artillery are made. Such plans include—

- a.* Strict regulation of radio operation which may include silencing of certain stations or establishing dummy stations as needed for deception.
- b.* A plan for the most effective use of existing wire circuits.

118. COMMUNICATION DURING DISPLACEMENTS

Before and during a displacement—

a. Communication personnel continue the operation of existing systems while preparing for displacement. Existing wire circuits are spliced to new circuits.

b. Wire circuits not required by units are removed. When time does not permit complete recovery, the abandoned wire lines should be cut in several places.

c. Radio silence normally is maintained within units moving to the rear. However, for purposes of deception the normal level of radio traffic may be maintained at the old position. This may entail the use of dummy radios.

d. All practical means of communication are used. Existing wire circuits between the old and new positions are used. Messenger service is available at all times.

Section VII. AIRBORNE OPERATIONS

119. GENERAL

a. The division artillery of an airborne division is organized as shown in figure 18. Because of a lack of transportation, airborne artillery has a limited amount of signal equipment. To offset this lack of equipment, a simple communication system, which has less flexibility than that of the infantry division artillery units, is installed initially. As the wire and radio systems expand, they become similar to those of infantry division artillery units.

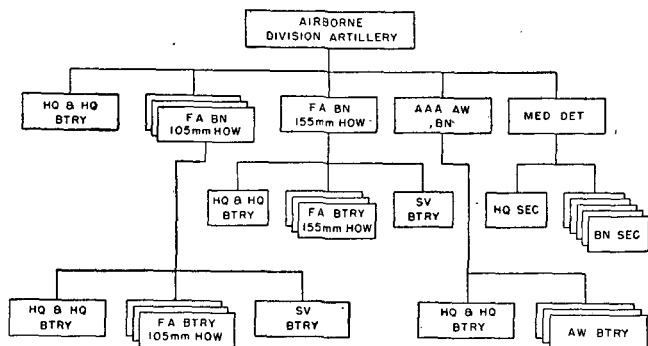


Figure 18. Organization of the airborne division artillery.

b. Communication in the 105-mm howitzer battalions is established immediately after landing by means of portable radio sets. Wire communication is established as soon as the battalion reaches a position from which it is able to deliver fire on all of its initial targets. Wire is used sparingly and is not laid unless the situation dictates its use. Because of shortages of equipment and personnel in the initial assault, it takes longer to establish the wire system than normally is required in the infantry division artillery. Initially, all distances have to be covered on foot. Forward observer sections and their equipment are dropped with the front-line infantry companies. Liaison sections and their equipment are dropped with infantry battalion headquarters. Communication is established initially by use of radios. As soon as the situation becomes somewhat stabilized, wire communication is established. The necessity of hand-carrying the signal equipment requires the use of lightweight items.

c. The 155-mm howitzer battalion usually will be under division artillery command and control as soon as radio communication is established between the two headquarters. Some wire laying vehicles will accompany the medium battalion and wire communication will be established as soon as the battalion is in position. When the battalion follow-up serial arrives, communication systems similar to those of the medium battalion of the infantry division will be established.

d. Antiaircraft batteries may be attached to combat teams or held under control of the antiaircraft battalion commander. Light automatic weapons may be committed by parachute; heavy weapons may be glider-landed. Communication facilities are limited. Radio is used initially. Wire must be laid when the situation warrants.

120. TACTICAL APPLICATION OF COMMUNICATION

a. Communication at division artillery and between division artillery and subordinate units is established initially by means of hand-carried wire-laying devices and portable radios. The commanding general of division artillery may employ a vehicular-mounted radio. More complete communication is established as the situation develops and more communication equipment becomes available. Complete wire nets are similar to those in the infantry division artillery. A type radio system for airborne division artillery is shown in figure 19.

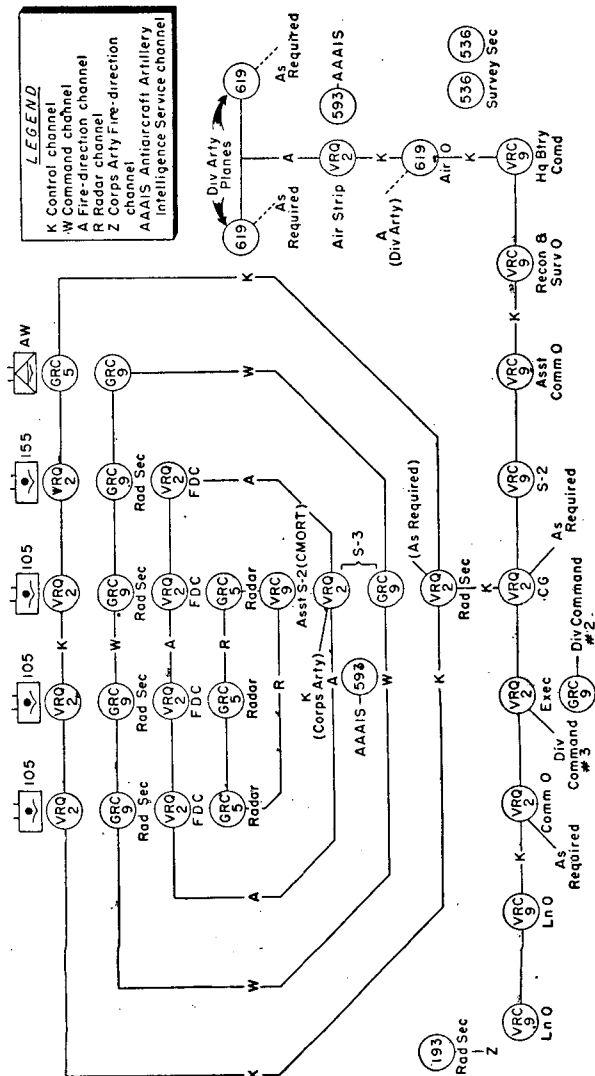


Figure 19. Type radio system, airborne division artillery.

b. Within the 105-mm howitzer battalions, communication is established initially by hand-carried wire-laying devices and portable radios. Messengers may be sent to the infantry regimental command post. Radio communication is established with division artillery. The battalion normally reverts to division artillery control as soon as communication is established with division artillery. As more radios become available the radio system is developed (fig. 20). Howitzer batteries install direct wire circuits to the battalion fire-direction center as well as the trunk circuits between battalion and battery switchboards. Battalion installs trunk circuits to the infantry regiment and to the artillery liaison officers at the infantry battalion command posts. Artillery battalion wire teams start from the battalion switchboard and liaison section teams start back toward the artillery battalion, using predetermined routes. Because of initial shortage of telephones, circuits are not laid to security elements protecting artillery positions (fig. 21).

c. Except as modified by available lift space, the communication systems of the 155-mm howitzer battalion of the airborne division are similar to those of the medium battalion of the infantry division. For radio nets employed, see figure 22.

d. Communication in the airborne antiaircraft battalion is limited initially to portable equipment. Communication within the battalion is similar to that employed by the antiaircraft battalion of an infantry division. For complete radio nets employed by the airborne battalion, see figures 23 and 24.

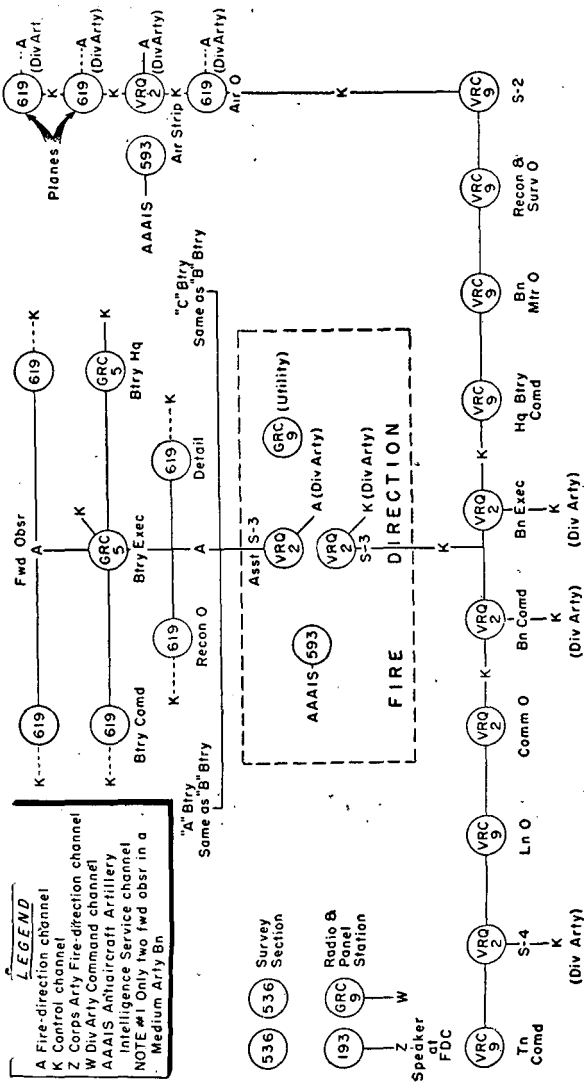


Figure 22. Type radio system, 155-mm howitzer battalion, airborne division.

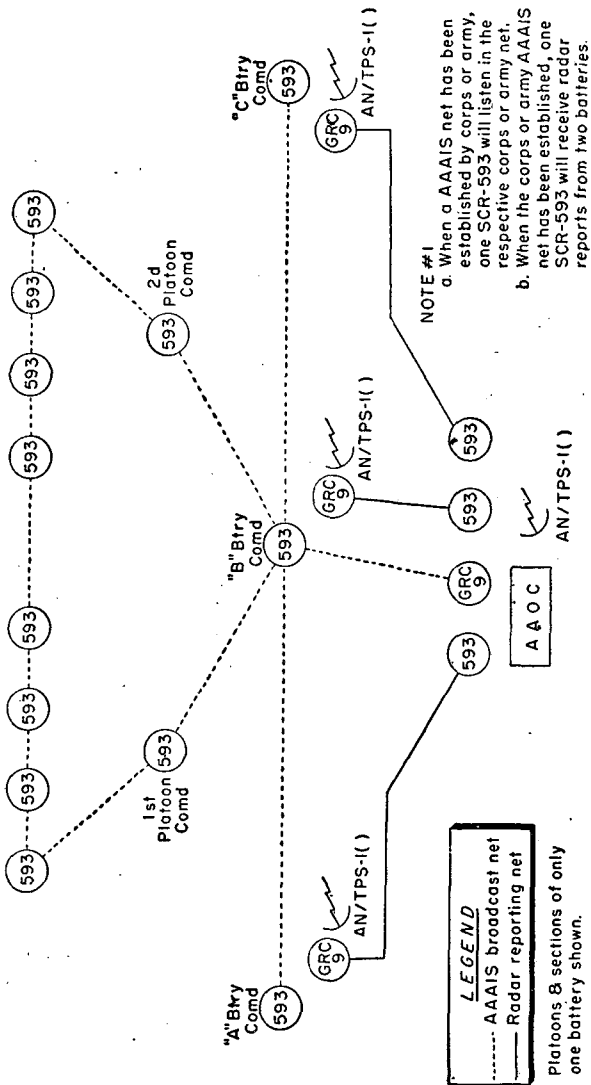


Figure 23. Type radio system, AAAS and radar, airborne AAA AW battalion.

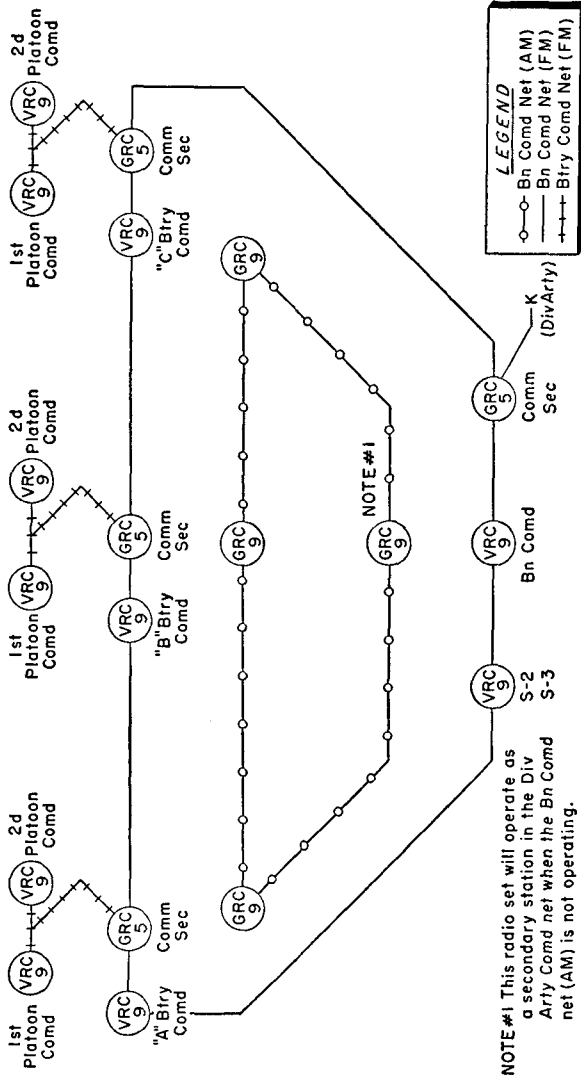


Figure 24. Type radio system, command, airborne AAA AW battalion.

Section VIII. COMMUNICATION IN SUPPORT OF ARMORED UNITS

121. GENERAL

When truck-drawn artillery supports an armored unit, organic to the infantry division or otherwise, adequate plans are made for effective communication between units. Because of the manner in which tanks are employed, wire communication ordinarily is not feasible. Extensive reliance is placed on radio communication.

122. RADIO

If the organic radio sets of artillery and armored units differ in frequency coverage, radio communication may be established in either of two ways—

a. An overlap channel common to the radios of both units is provided for the operation, or

b. The armored unit furnishes one of its radios to the artillery fire-direction center to provide communication between artillery forward observers with the tanks and the fire-direction center. Each tank company in the infantry division has available a tank that may be used by an artillery forward observer. Artillery liaison officers and additional forward observers normally operate their organic radios on assigned artillery frequencies.

123. WIRE

Wire is the principal means of communication between truck-drawn and armored artillery units when

they are working together. When special situations dictate the use of radio, communication may be established by exchanging liaison officers with organic radio equipment and operators. These radios remain preset to the frequencies of their own units. This exchange provides communication between fire-direction centers and, in addition, provides channels whereby forward observers may transmit fire missions directly to either or both of the fire-direction centers.

CHAPTER 5

INFANTRY REGIMENT

Section I. GENERAL

124. ORGANIZATION

The infantry regiment is organized as shown in figure 25. Regimental and battalion headquarters companies include communication platoons, each of which is normally divided for operations into a platoon headquarters, a message center section, a wire section, and a radio and visual section. The heavy

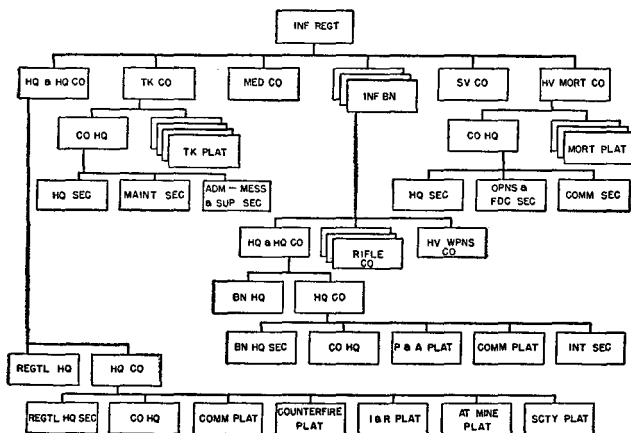


Figure 25. Organization of the infantry regiment.

mortar company includes a communication section. Communication personnel in other units are assigned to the various headquarters, platoons, and sections. Communication personnel total approximately 12 percent of the regimental strength.

125. SIGNAL OPERATION INSTRUCTIONS

The regiment receives sufficient copies of the division SOI for distribution to battalions and the heavy mortar company. Other regimental units are issued extracts prepared by communication officers. For further details, see paragraph 14 and FM 24-16.

126. RESPONSIBILITY FOR TRAINING

Regimental and battalion communication officers are special staff officers and, as such, advise and assist the S-3's in the preparation of training directives regarding communication. Company commanders are responsible for the organization and conduct of all training in their companies. The regimental communication platoon leader and the battalion communication officers are responsible to their company commanders for the conduct and status of all training in their platoons. The chief communication non-commissioned officer (in units having no communication officer) is responsible to his company commander for the conduct and status of communication training in his company.

127. MESSAGE PROCEDURE IN COMMAND POSTS

a. Incoming Messages. All incoming special messengers report first to the message center where they are directed to the sergeant major. He signs for the messages or instructs the messengers where and to whom they will be delivered. Special messengers report again to the message center before leaving the command post to pick up any messages for delivery to their unit or activity. Scheduled messengers deliver their messages to the message center; the messages are signed for and delivered to the sergeant major. He supervises the circulation of all incoming messages to the proper officers and their entry in the unit journal.

b. Outgoing Messages. Outgoing written messages usually are sent through the message center. Records kept by the message center include a *live file* (duplicates or skeleton copies of outgoing messages for which a receipt has not yet been obtained), a *dead file* (duplicates or skeleton copies of receipted outgoing messages), and a *message center log* (a record of the electrical means of communication available and the numbers assigned to outgoing messages). The dead file is turned over periodically to the adjutant for disposition. Officers who send or receive messages that do not pass through the message center insure that a synopsis of each message is made available without delay for entry in the unit journal. For further information on command post operations, see FM 7-40.

Section II. COMMUNICATION & CONCENTRATION

128. GENERAL

Before the arrival of the regiment in the division area, a reconnaissance of the regimental area is made. Communication officers and selected enlisted men are included in the reconnaissance party in order that adequate communication may be established without delay. During the period of the concentration, communication personnel operate the communication system, continue training, prepare plans, and maintain equipment (par. 48).

129. TACTICAL APPLICATION OF COMMUNICATION

Commercial wire installations are used whenever possible; additional construction is held to the minimum necessary for adequate control. Instructions concerning the use of commercial equipment are furnished by the division signal officer. Restrictions may be placed upon the use of radios to preserve secrecy and to conserve batteries, but reconnaissance and warning nets may be operated. Transmissions in these nets may be limited. Both motor and foot messengers are used extensively during concentrations. Elaborate command post installations are avoided. Each headquarters is established in its assigned area and is located so as to facilitate communication.

Section III. COMMUNICATION DURING MARCHES AND HALTS

130. COMMUNICATION DURING MARCHES

a. General. Communication during marches is maintained between the regimental march command post and the next higher unit, adjacent columns, security and reconnaissance elements, command posts of major units with the columns, and trains. Communication is also maintained within units in the columns. The principal means of communication are radio and messenger (motor, foot, and light aircraft). These means are supplemented by visual and sound. Pigeons, if provided, may be used from a unit to a fixed loft. Radio is restricted or silenced if secrecy is imperative. March orders include communication instructions and the locations of command posts. Much of the information needed is included in standing operating procedure and, therefore, may be left out of the order.

b. Radio. Radio is an effective means for controlling units during a march. Command nets may be organized to include platoons. Some secrecy of movement is achieved through the use of cryptosystems and by reporting positions in reference to phase lines and march objectives. Radio nets are organized to insure that operating ranges of radio sets are not exceeded. All commanders and operators familiarize themselves with the details of net organization and cryptosystems to be used. The ranges of radios are reduced during movement and

when line-of-sight locations cannot be selected. Radios in light aircraft and those with liaison officers may be used to establish radio communication with adjacent columns and units and within extended columns.

c. Messengers. Messengers are used by all units during a march. Foot messengers are used from front to rear. Motor messengers are used between adjacent columns and may be sent to the front or rear. Messages may be exchanged between moving vehicles. Light aircraft messengers facilitate communication between adjacent columns, to distant higher headquarters, and within extended columns. Messengers are informed before the march of the route, formation, locations of command posts, and special vehicular markings.

d. Visual. If visual signals are prescribed, look-outs are assigned areas of responsibility in which to observe for such signals. Pyrotechnics may be employed to report the reaching of a phase line or march objective, for communication between ground and air, to warn of air or mechanized attack, and to transmit other prearranged messages. Panels are used to identify friendly columns, specific vehicles in a column, command posts, and message-drop and message pick-up areas. Panels are kept ready for use, and panel teams may leave the column temporarily to communicate with aircraft.

e. Wire. Wire normally is not installed during a march; however, commercial wire systems and existing field wire circuits may be used.

f. Command Posts. Command posts are located to facilitate control of the column. During motor movements, they move at definite places in the column. The regimental command post travels at the head of the main body of the regiment. The command post of a battalion serving as advance guard for the regiment travels at the head of the reserve. Command posts of units in the main body are located at the heads of their respective units. A motorized command post consists only of essential command and communication vehicles. Communication vehicles include those for messengers, panel teams, radios used during the march, and additional radios for emergency use. Wire vehicles required during or immediately after the march are also included. Communication personnel not required to maintain communication during the march travel in the headquarters company serial and are located near the command group. During foot marches, command posts may be motorized and move by bounds between units. Their composition and relative location within the column are the same as during a motor march. Vehicles and designated personnel not required to maintain communication during the march move near the head of the motor element. Communication personnel who cannot be transported march with their units.

131. COMMUNICATION DURING HALTS

During temporary halts, communication is maintained as during the march. During prolonged halts, such as overnight halts, messengers are used

extensively. Radios are used except when their use is restricted for security reasons. Wire is installed, the amount depending upon the need for wire communication, supply of wire available, and the duration of the halt. It is particularly desirable for regiment to have wire communication to lower units during overnight halts. If a quartering party precedes the march, inclusion of communication personnel facilitates the establishment of communication in the bivouac or assembly area. Communication, including wire, is established to and within the outpost. The communication system within the outpost is similar to that used during defensive operations (par. 143).

Section IV. COMMUNICATION DURING THE APPROACH MARCH AND IN ASSEMBLY AREAS

132. COMMUNICATION DURING THE APPROACH MARCH

In the approach march, the means of communication used on marches in tactical column are continued. Radio and messenger are the principal means of communication. Light aircraft, visual and sound communication are used to supplement the principal means. Communication security measures continue to be enforced as in marches in tactical column. Cryptography is used extensively except when clear-text messages may be transmitted without violating security restrictions. Difficulties are

increased for messenger communication with units that assume extended formations or are moving cross country. March command posts are more difficult to locate, and the speed of messengers is reduced. Instructions to messengers are more explicit. The use of wire in the approach march depends upon the rate of advance, the distance to be covered, future plans, the speed at which wire can be laid, and the supply of wire. The premature establishment of the wire system results in the loss of wire, overextension of circuits, and delay of the installation of communication for the next operation. March command posts are located to facilitate control. In deployed units, they are well forward and near the center of the formation. Command posts follow natural routes of communication to facilitate signal communication. Communication officers and their assistants keep abreast of the situation, supervise the operation of the communication system, and plan continuously for future operations.

133. COMMUNICATION IN ASSEMBLY AREAS

Upon arrival in an assembly area, temporary command posts and a limited communication system are established. The means of communication are employed as during prolonged halts (par. 131). The communication officer is informed of the commander's plan for the next operation at the earliest practicable time. Communication personnel install, operate, and maintain the communication system for the assembly area and prepare for the next operation.

Section V. COMMUNICATION DURING THE ATTACK, REORGANIZATION, AND PURSUIT

134. PLANNING AND ORDERS FOR THE ATTACK

a. To facilitate coordination of communication matters, regimental and battalion commanders take their communication officers with them to hear the order of the next higher commander. Communication officers normally are present when commanders announce their plans and issue their attack orders. In case a communication officer is not present when the higher commander issues his order or when his commander announces his plan, he is informed of latest developments in the situation and the tactical plan by the commander or the S-3 at the earliest practicable time.

b. As soon as the communication officer is informed of the plan of attack, he completes his map and ground reconnaissance. He discusses tentative plans with the S-3 before going on his reconnaissance. He takes wire personnel and other selected members of the communication platoon with him. He submits recommendations for the contents of paragraph 5 of the operation order to the S-3. After the location of the new command post has been approved, the communication officer orders most of the communication platoon to go there. Only necessary personnel are left to provide communication in the assembly area until the command post for the attack is occupied. Selected personnel may be instructed to precede the platoon to the designated command

post location to receive orders and reconnoiter before the arrival of the platoon. The above procedure is simplified and the installation of the communication system expedited when the initial location of the command post is situated within the assembly area.

c. Following the issuance of the order for the attack, the communication officer completes the coordination of his plans with others concerned, including the staff, lower unit commanders or communication officers, and supporting units. He then proceeds to the designated command post area with the S-1 to determine its exact location and interior arrangement. The communication officer then issues oral instructions for the establishment of the communication system. The duties and actions of the communication noncommissioned officer in a company are similar to those of a communication officer.

135. WIRE COMMUNICATION DURING THE ATTACK

a. General. Wire is the principal means of communication in the attack when it can be established and maintained. A wire construction team from the division signal company lays trunk lines from division into the regimental command post and remains with the regiment to extend and maintain these lines.

b. Functions of Regimental Communication Platoon. The regimental communication platoon lays one trunk line to each battalion in the attacking echelon, one to the heavy mortar company, one to each of the attached units, and one to the observation

post. The installation and maintenance of these trunk lines taxes the capacity of authorized wire teams in fast-moving situations or when maintenance is very difficult. Wire is laid to a reserve battalion when its commitment to action is imminent. A line is laid to the tank company when required by its location and the tactical situation. One circuit may be established to service company, either directly from the regimental switchboard or from the switchboard of a unit in the vicinity of the regimental field train bivouac area. The existing division wire system may be used to avoid duplication of effort. The circuit to the observation post may be established through a battalion switchboard. Certain radio remote-control units are connected to the switchboard. Wire lines from higher and supporting units and to lower units may be simplexed to provide additional circuits (FM 24-20). When time is available, local lines are laid to the collecting station and the motor park. Sound-powered telephone equipment is provided for use within the counterfire and security platoons. Normally, lateral lines are not laid during an attack. Lateral communication is obtained through the switchboard of the next higher headquarters.

c. Telephone Facilities at Regimental Command Post. Telephones in the command post are installed according to the priority established in the regimental SOP. A telephone for the message center is given a high priority. Initially, telephones are shared by two or more officers. The executive officer uses the regimental commander's telephone. The S-2

and S-3 share one telephone, and the S-1 and S-4 use one jointly. Additional telephones are installed as rapidly as possible. See figure 26.

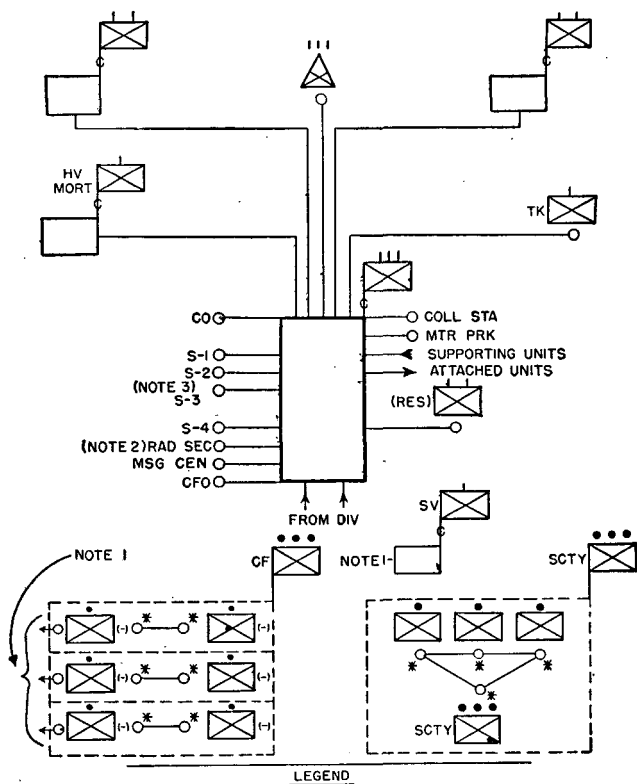
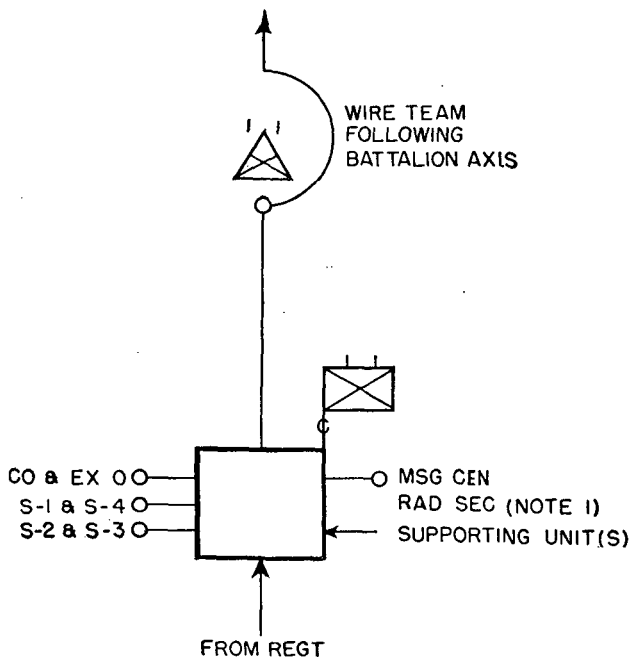


Figure 26. Type wire system for an infantry regiment in attack.

d. Functions of Battalion Communication Platoons. The battalion communication platoon lays one line to the battalion observation post. This wire-head is extended as the attack moves forward. Its installation and maintenance are given first priority. A line is usually laid to the heavy weapons company or to the 81-mm mortar platoon. One line may be laid to each of the rifle companies in the attacking echelon, depending upon the time available, the need for wire communication, and the personnel and equipment available. If this is not done the battalion wire-head may be used for communication to the companies. Only essential telephones are installed within the command post. Initially, these may be restricted to one for the commander and executive officer, one for the staff, and one for the message center. Command radios may be connected to the switchboard or other designated point by use of remote-control equipment. See figure 27.

e. Rifle Company. In the rifle company, the employment of wire depends upon the personnel, equipment, and time available to install, operate, and maintain the wire system. Designated personnel are trained to perform the duties of field linemen and switchboard operators in addition to their other assigned duties. One man, using a wire dispenser and telephone, can lay a wire line and while moving, have continuous communication. Wire may be recovered and reused by using light reel equipment. In fast-moving situations, only short fire-control lines are laid. Wire may be used during halts, particularly overnight halts. Sound-powered telephone equipment is used within the 60-mm mortar section for



**NOTE 1: RAD SETS MAY BE
CONNECTED TO THE SWITCHBOARD OR
OTHER DESIGNATED POINT BY USE OF
REMOTE CONTROL EQUIPMENT**

Figure 27. Type wire system for an infantry battalion in attack.

communication between observers and the mortars.

f. Heavy Weapons Company. The company uses wire communication whenever practicable to control the mortar platoon fires. Observation posts, the fire-direction center, and the mortar position are connected to the platoon switchboard. This may be the

maximum extent to which wire communication is used by the company in the attack, since its use is governed by the same factors as in the rifle company. A wire line is laid from battalion to the heavy weapons company before the attack. If the company wire system includes lines to all platoons, the line from battalion terminates at the company switchboard (fig. 28). If wire is used only within the mortar platoon, the battalion line may be connected to the mortar platoon switchboard. In this case, the company command post may install a local telephone connected to the mortar platoon switchboard. Maintenance of wire communication with battalion may be impractical during rapid displacement. In such cases, the company wire system may be abandoned and re-established at the new location. Sound-

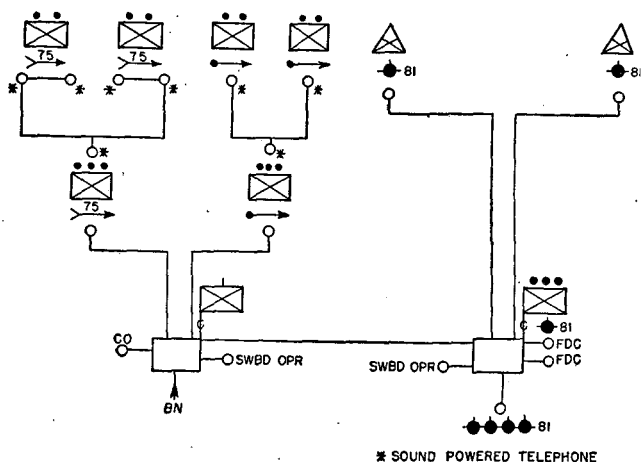


Figure 28. Type wire system for a heavy weapons company.

powered telephone equipment is available for use in the 75-mm rifle and machine gun platoons.

g. Heavy Mortar Company. In the heavy mortar company, the communication section lays lines to the mortar positions and installs telephones within the command post for the company commander and the fire-direction center (fig. 29). Lines to observation posts are laid by forward observer parties which may include personnel from the company communication section. The installation of these lines depends upon

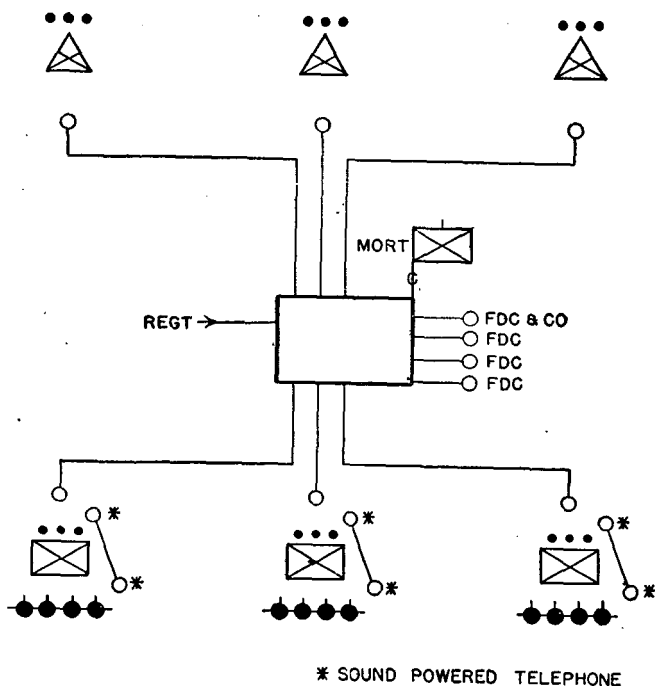


Figure 29. Type wire system for a heavy mortar company.

the relative location of the fire-direction center, tarts, and observation posts. Sound-powered telephone equipment is available in the platoons for controlling the firing of the mortars, for communication to ammunition supply points, or for other purposes.

h. Tank Company. The tank company does not use wire in the attack. A telephone handset is available on the outside of each tank for communication between the tank crew and personnel on the outside of the tank.

i. Medical Company. The medical company uses the line from the regimental switchboard to the collecting station. Each of the battalion medical platoons is equipped with a field telephone which it may connect to a line from the battalion switchboard.

j. Service Company. The service company is usually connected to regiment by wire. Service company lays local lines to the elements of the field train bivouac (fig. 30).

136. RADIO COMMUNICATION DURING THE ATTACK

a. General. Radio communication is available in all units down to and including platoons. To attain secrecy and surprise, the use of radio may be restricted until a prescribed time. A further restriction on the use of radio may be directed for maneuvering and reserve units before commitment. However, radio silence is not carried to the point of becoming a handicap to the attacking echelons. When it is probable that the enemy knows the loca-

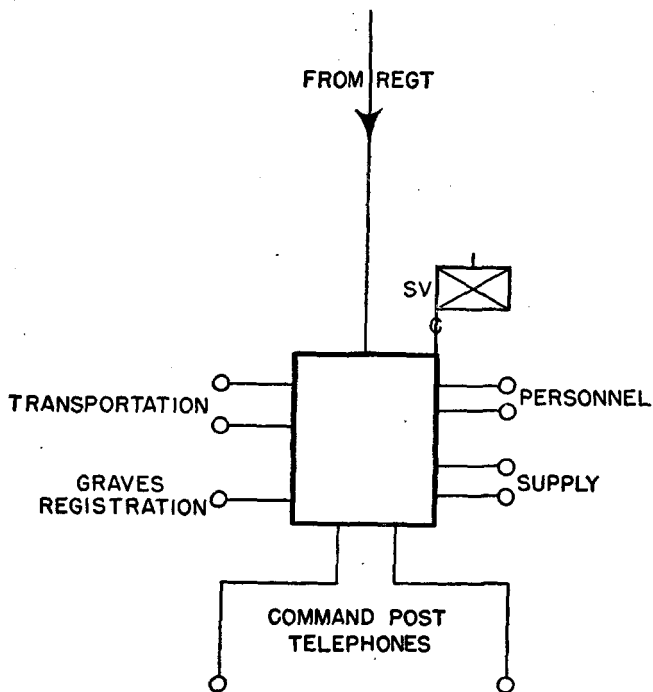
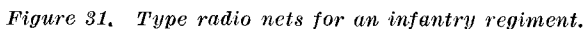


Figure 30. Type wire system for a service company.

tion or anticipates the movements of friendly units, or after contact is made, there is little to gain by imposing radio silence. Radio nets operated within the regiment are flexible and may be altered as required by the situation. The number of frequencies available varies. At times, more than one net may operate on the same frequency.

b. Infantry Regiment. The regiment communicates with division in two different command nets, one using amplitude-modulated radio equipment and

the other using frequency-modulated voice radios (fig. 31). Two regimental command nets are established to include the battalions, the intelligence and reconnaissance platoon, and the heavy mortar company. The radio sets operated in these nets are of the same types as those used for communication with division. A command net is established between regiment and the tank company, using frequency-modulated voice radio sets. A special purpose net may be established, including an amplitude-modulated set at the command post, one with each liaison officer, and one with service company at the field train bivouac area. These sets may operate in the regimental amplitude-modulated command net if the amount of traffic does not warrant operation of the special purpose net. Each liaison officer is also provided with a frequency-modulated voice radio for communication with the command post in a liaison net. Operation of these sets in the regimental frequency-modulated command net may be authorized. Radio sets are available for direct communication with light aircraft, supporting artillery, engineers, and the reconnaissance company. A set is also available for operation in a warning net when one is established. Portable voice radios are used in the counterfire platoon for communication within squads and between squads and the counterfire officer at the regimental fire information center. These sets may also be used to communicate with supported units. The intelligence and reconnaissance platoon is provided with radio sets for communication within the platoon and to the regimental command post. The portable sets are used for communication within the



platoon whenever possible. The regimental commander takes radios and operators with him when he leaves the command post. The types of radios taken are determined by the nets in which he desires to communicate.

c. Infantry Battalion. Each battalion operates radio sets in both regimental command nets (fig. 32). A battalion command net is established to include the battalion command post, each rifle company, the heavy weapons company, and the battalion observation posts. The battalion and rifle company commanders are also in the net when they leave their

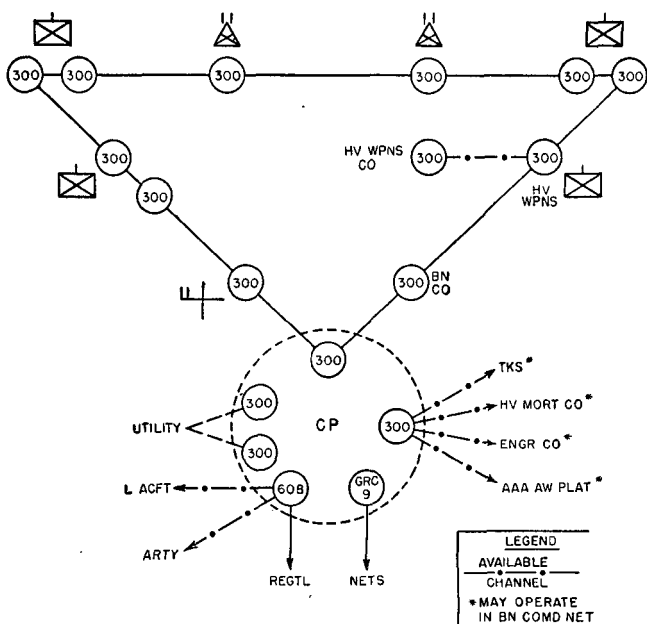


Figure 32. Type radio nets for an infantry battalion.

command posts. The medical platoon's radio may monitor the battalion command net. The battalion's radio equipment enables it to communicate directly with light aircraft, supporting artillery, engineers, and other units having similar radios. Radio communication with all tanks in the tank company is available.

d. Rifle Company. A rifle company radio set operates in the battalion command net (fig. 33). Sets that net with all stations in the company command net and battalion command net are available to ac-

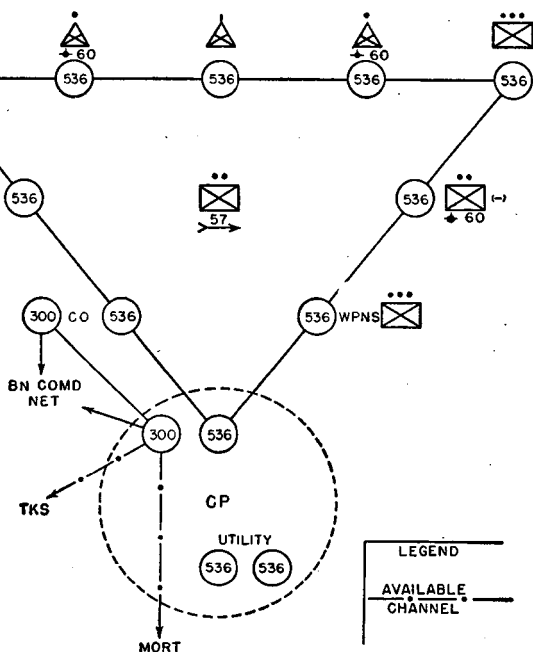


Figure 33. Type radio nets for a rifle company.

company the company commander when he is at the command post. A company command net is operated to include the company command post, rifle platoons, weapons platoon, observation posts (company and mortar platoon), and the company commander (when he leaves the command post). The 57-mm rifle section may be included in the command net. Utility sets are available to furnish communication with patrols, to supplement the mortar section radios, to replace inoperative sets, or to communicate with attached or supporting units. The company may communicate with stations in the command and mortar fire-control nets of the heavy weapons and heavy mortar companies and with all tanks in the tank company.

e. Heavy Weapons Company. The heavy weapons company operates a radio in the battalion command net (fig. 34). A set is available to the company commander for communication while he is away from the company command post. A company command net is operated to include the command post, the machine-gun platoon, the mortar platoon, and the 75-mm rifle platoon. The company commander's radio usually operates in this net. The mortar platoon has radios that are operated in a fire-control net including stations at the observation posts, the fire-direction center, and the mortar position. The 75-mm rifle platoon has radios for the control of its sections.

f. Heavy Mortar Company. The heavy mortar company operates radios in both of the regimental command nets (fig. 35). Portable radios are used for command and fire control within the company. These sets may be operated in a single net including

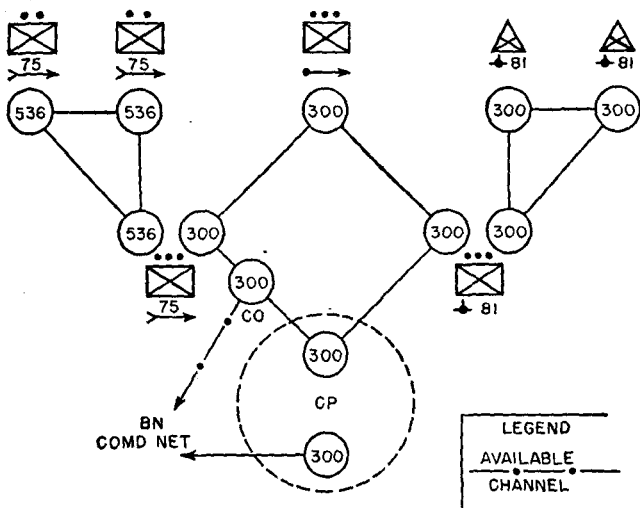


Figure 34. Type radio nets for a heavy weapons company.

the fire-direction center, observation posts, and firing positions; or in two nets on separate frequencies—one net from the fire-direction center to the observers and the other net from the fire-direction center to the firing positions. When a platoon is operating separately, direct radio communication is established between the observation post and the platoon fire-direction center. Radio communication with supporting artillery and tanks is available.

g. Tank Company. The tank company operates a radio in direct communication with the regimental command post (fig. 36). One of the receivers on the radio in the company commander's tank may be used for this purpose, or the set at the regimental command post may operate in the tank company com-

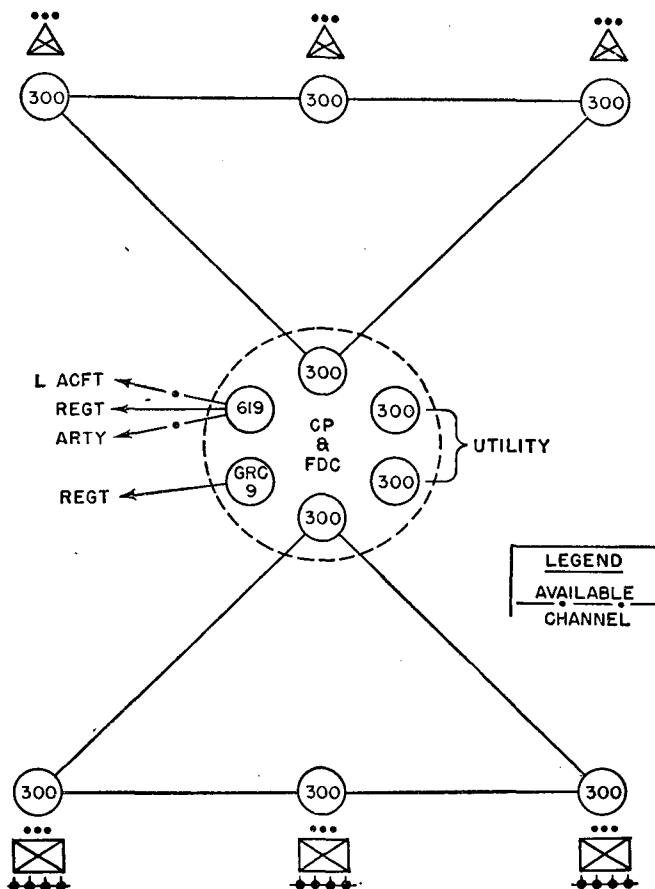


Figure 35. Type radio nets for a heavy mortar company.

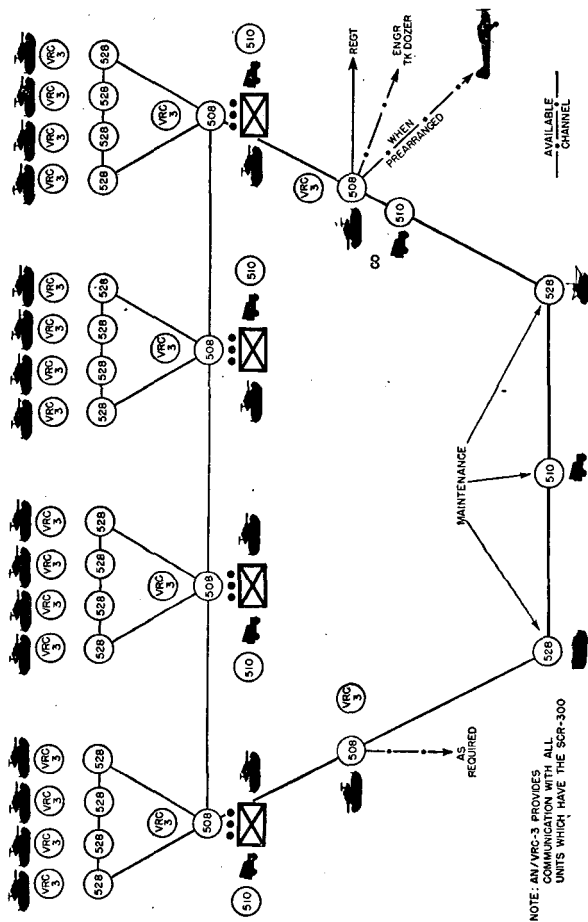


Figure 36. Type radio nets for a tank company.

mand net. A company command net is established, including the company command post (company commander's tank) and the tanks of the four platoon leaders. This net also includes the radios mounted in the company commander's 1/4-ton truck, the other company headquarters tank, and the maintenance vehicles. Each platoon operates a command net that includes the radios in the platoon leader's vehicles and those in each tank in the platoon. These nets may operate on the same frequency as the company command net, depending upon the number of frequencies available to the company. The company commander is responsible for the use of the radios in the company. His plans for their use must be flexible and complete to insure adequate radio communication in all situations. Each tank is provided with a radio set for direct communication with other regimental units during coordinated infantry-tank action.

h. Medical Company. The medical company is provided with radios for the collecting station and each battalion aid station. The collecting station may operate its radio in a net controlled from the regimental command post. A battalion aid station may operate its set in the battalion command net or with another radio located at the battalion command post.

i. Service Company. Service company operates its radio set at the field train bivouac area as a secondary station in the special purpose net or in the regimental amplitude-modulated command net as directed.

137. MESSENGER COMMUNICATION DURING THE ATTACK

Special messengers are used by all units during the attack. Initially, each rifle company sends two messengers to the battalion command post. One of these messengers remains at the battalion message center to carry messages back to his company. The other messenger returns to his company to carry messages back to the battalion. Messengers are exchanged each time either command post displaces to a new location. This practice speeds messenger service since both messengers know the locations of the command posts and routes leading to them. For further information on messenger communication, see paragraph 29, and FM 21-75.

138. VISUAL AND SOUND COMMUNICATION DURING THE ATTACK

Visual and sound signals are used to transmit pre-arranged messages prescribed in the SOI or by the commander. Each commander insures that orders and proper equipment are issued to units that are to implement the visual communication plan, particularly for ground-to-air communication. For further information on visual and sound communication, see paragraphs 30 and 31.

139. COMMAND POSTS DURING THE ATTACK

a. To avoid displacement during the early stages of the attack, regimental and battalion command posts are initially established as close to the line of

departure as practicable. Throughout the attack communication officers plan for prompt displacement of command posts and efficient and continuous communication during displacement.

b. The initial command post of a *rifle company* is located close to the line of departure. It is moved forward as the company advances. New locations are reported to battalion promptly.

c. The *heavy weapons company* command post is located in the vicinity of the battalion command post.

d. The *heavy mortar company* command post is located near the company fire-direction center. Both installations are established at the place offering effective control of mortar fires. To facilitate communication a location near the regimental command post is desirable. The communication chief plans throughout the attack for the prompt displacement of the command post and fire-direction center.

e. The *tank company* command post is located in the vicinity of the regimental command post except when the entire company is committed in the same action or when the presence of the command group is required elsewhere to effectively control the employment of a portion of the company.

f. The *medical company* establishes its command post with the collecting station. These two installations are usually from 1,200 to 3,500 yards to the rear of the front lines and away from military objectives. Battalion aid stations normally are located in the vicinity of battalion command posts. The regimental and battalion surgeons keep abreast of the tactical situation and are prepared to displace forward.

g. *Service company* establishes its command post

in the field train bivouac area. These installations are usually 5 to 10 miles in rear of the front lines. The S-4 insures that they displace forward, when necessary.

140. DISPLACEMENT OF COMMAND POSTS

a. Wire. The communication officer keeps abreast of the tactical situation at all times. He obtains timely information of contemplated displacements of the command post from the S-3 or the commander. The regimental command post normally moves along the best available route of communication through the regimental zone of action. It may follow the axis of signal communication of one of the battalions or an axis generally through the center of the regimental zone. To expedite the establishment of communication from the new location and to minimize the number of new lines to be laid, existing wire circuits may be used during displacements. The communication officer constantly reconnoiters and plans for the extension of the wire system. If the regimental command post is following the axis of one of the battalions, the existing wire line may be used for communication from the new location to the rear. The command post may displace along the regimental observation post line, and the communication officer insures that this line is extended as the attack progresses. He anticipates displacements by installing as many wire lines in subsequent locations as the tactical situation permits.

b. Opening the New Command Post. Displacement of the regimental command post is carefully

coordinated to avoid disrupting communication and loss of control. Before a change of location is made, essential communication facilities are established at the new command post site. Other units concerned are notified of the contemplated change. If the location of the new command post has been prescribed, a quartering-party including the S-1, communication officer, guides, security personnel, and communication personnel goes to the new location soon after the area has been secured. The advance echelon of the regimental communication platoon may follow the quartering party. The exact site is selected, and locations for the various installations are designated. Communication is established, and guides and security personnel are posted. If the new location has not been prescribed, the S-3 and the communication officer confer and submit a recommended location to the commander for his approval. When the new location has been approved, the quartering party and the advance echelon of the communication platoon go to the new location and proceed as previously explained.

c. Closing the Old Command Post. When the command post site is ready for occupancy, the commander is notified. The command group moves to the new location according to his instructions. Sufficient personnel, including communication personnel, remain at the old command post to operate and close the command post. Upon orders of the commander, the old command post is closed and the new command post opened at the same time. All personnel go to the new command post except a guide who remains temporarily to direct messengers to the new

location. All units concerned are notified when the new command post is opened.

d. Battalion and Company. The above procedure may be simplified in battalions and smaller units. When the commander, accompanied by sufficient staff and communication personnel, is forward, the new command post location may be selected and displacement completed very rapidly. When radio and messenger communication are the only means available to lower units, displacement can be accomplished as rapidly as wire communication with the higher unit can be established from the new location. Since the wirehead normally follows as close to the leading elements as practicable and the command post displaces along this line, the wire normally will be established by the time the commander desires to move the command post. When only radio and messenger communication are used to both lower and higher units, the command post can be moved without delay. This method frequently is used by the rifle company and enables the command post to follow the rifle platoon as closely as desired without losing communication with lower and higher units.

141. COMMUNICATION DURING REORGANIZATION

The means of communication used during the attack are continued in operation during reorganization. Communication officers and noncommissioned officers prepare for the next operation and take action to obtain replacements for losses of personnel and equipment within their units. They reassign duties

and reallocate equipment and supplies, pending the arrival of replacements. Repairs and improvements in the communication system are made. Faulty signal equipment is repaired or replaced and units resupplied with wire and batteries.

142. COMMUNICATION DURING PURSUIT

Within units that are advancing to gain contact or encircling the enemy, the employment of the means of communication is similar to the tactical column and approach march phases of a movement to contact. Units in contact with and maintaining direct pressure against the enemy use their communication means as during the attack. Pursuit requires extensive reliance upon radio for communication. If organic radio sets do not provide adequate operating ranges, arrangements are made with the division signal company to obtain vehicular sets that are capable of operating over greater distances. The importance attached to enemy interception of radio traffic in other situations does not apply in equal degree during a pursuit. Existing wire lines along routes of pursuit are used if they are serviceable or can be repaired promptly.

Section VI. COMMUNICATION DURING DEFENSE AND RELIEFS

143. GENERAL

a. Advance planning and reconnaissance by communication personnel are essential in the defense. The actions and duties of communication personnel

are similar to those in the attack. The communication system is more elaborate and inclusive than in the attack. In the defense, time usually is available to improve the communication system to include the selection and preparation of alternate command posts. Command posts are located farther to the rear than in the attack. All possible steps are taken to insure uninterrupted operation of communication.

b. Communication to the advanced covering force and to the general outpost is established by higher headquarters. Control of the combat outpost of a front-line regiment normally rests with the regimental commander. The communicating officer recommends the method of establishing and maintaining communication with the combat outpost. When the outpost comprises elements of the front-line battalions, control of the outpost may be exercised through battalion commanders. In this case, each battalion provides communication to its part of the outpost. The communication system within the outpost is similar to that established by units on the main line of resistance. See appropriate defensive wire system and radio net diagrams.

144. WIRE COMMUNICATION DURING DEFENSE

a. General. Wire is the principal means of communication during defense. Initially, the wire system is similar to that established for the attack. It is expanded as rapidly as time, personnel, and equipment permit, and it is continuously improved during the conduct of the defense.

b. Regimental System. A wire construction team from the signal company lays and maintains at least two wire lines between the division and regimental switchboards. The regimental communication platoon lays two or more lines over different routes between the command posts of the regiment and front-line battalions (fig. 37). One or more wire lines are laid to the heavy mortar company. Wire is laid to the combat outpost, reserve battalion, tank company, collecting station, and regimental observation post. Wire communication is established with service company as during the attack (par. 135). Attached and supporting units are included in the wire system. Local telephones are installed as prescribed in the regimental SOP. Lateral lines connect the command posts of adjacent regiments (par. 5).

c. Battalion System. The battalion communication platoon lays a wire line to each company and to the battalion observation post (fig. 38). Attached and supporting units are included and a counterfire squad may be connected to the battalion wire system. Local telephones are installed. Sufficient sound-powered telephone equipment is available to provide communication to additional lower elements.

d. Rifle Company System. The rifle company establishes wire communication to all platoons and to the company observation post (fig. 39). Wire communication is established to control the fires of the mortar section. Wire is also used to control the 57-mm rifle section.

e. Tank Company System. The tank company

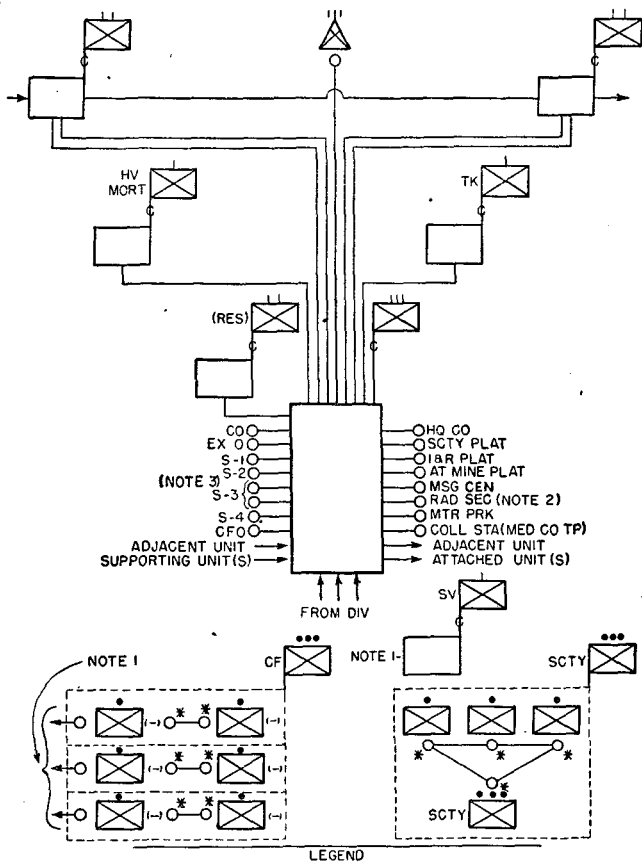


Figure 37. Type wire system for an infantry regiment in defense.

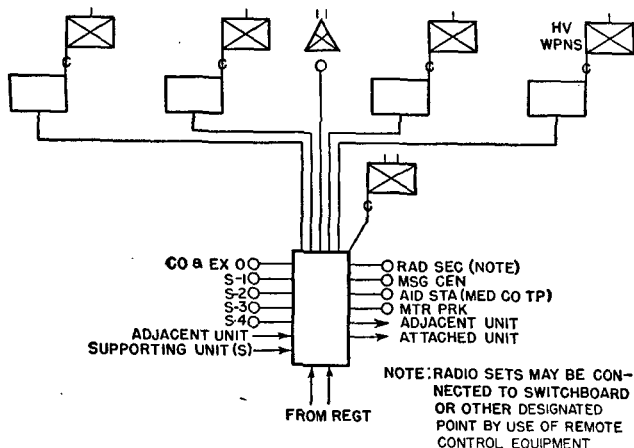


Figure 38. Type wire system for an infantry battalion in defense.

establishes wire communication to platoons under company control (fig. 40). Other platoons may be included in the regimental wire system through the switchboards of units to which they are attached.

f. Other Companies. Other companies use wire communication to the maximum extent practicable.

145. RADIO COMMUNICATION DURING DEFENSE

Radio communication normally is restricted for security reasons until contact with the enemy has been made. When adequate wire communication is available, radio transmitters are not used, but radio nets remain open for use if wire communication is interrupted or becomes inadequate.

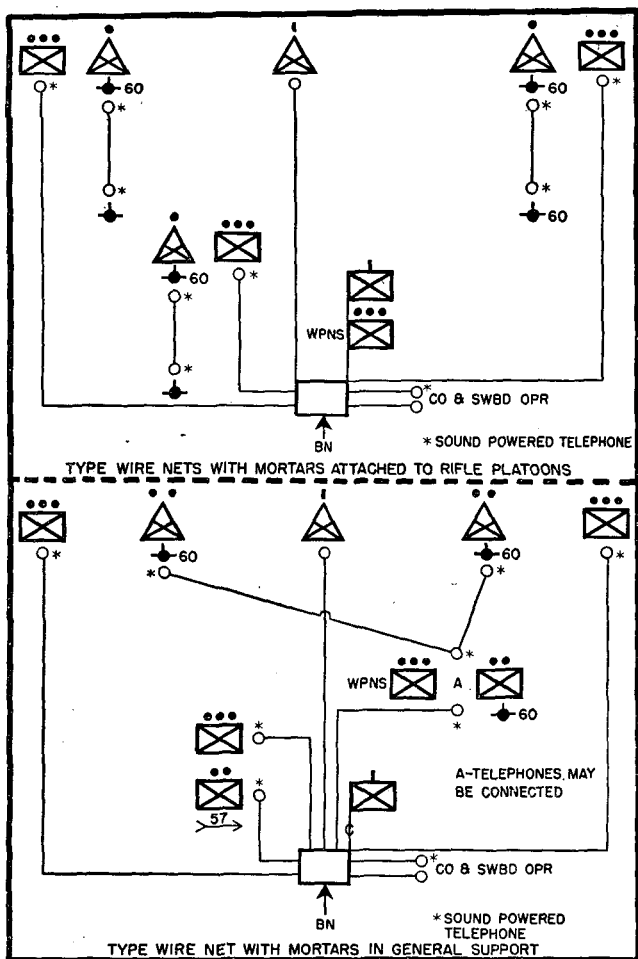


Figure 39. Typical wire nets for a rifle company in defense.

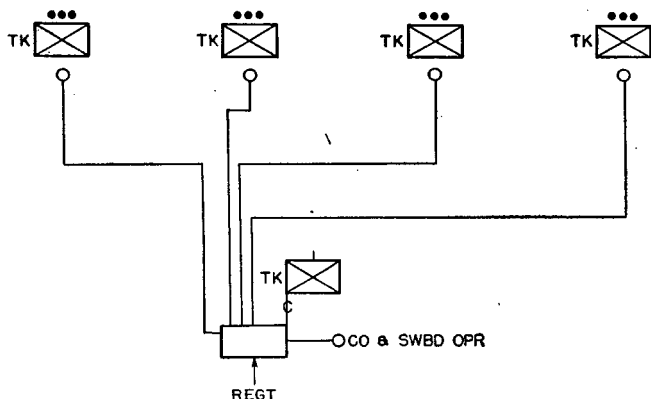


Figure 40. Type wire system for a tank company in defense.

146. MESSENGER COMMUNICATION DURING DEFENSE

Messengers are used to supplement the electrical means of communication. Scheduled messenger service may be established. For further information on messenger communication, see paragraph 29.

147. VISUAL AND SOUND COMMUNICATION DURING DEFENSE

Defensive situations afford greater opportunity for using visual signals requiring line-of-sight paths between observation posts and rear installations than attack situations.

148. COMMUNICATION DURING DEFENSE AGAINST AIRBORNE OPERATIONS

The extensive area assigned to a regiment in a defense against enemy airborne attack requires the

establishment of extensive wire and radio systems. Troop dispositions for antiairborne defense provide for a *local warning system*, a *local defense force*, and a *mobile striking force* on battalion level. The regiment establishes warning stations at the more likely landing areas within its area of responsibility. These warning stations provide information on which the regimental commander may base decisions for the conduct of the defense. The warning stations are connected with the regimental command post by every practical means of communication. Wire is buried a few inches underground to reduce destruction by enemy airborne personnel. Commercial wire lines are used to supplement the military wire system. Bombing before the airborne attack may interrupt communication. All communication personnel are continuously prepared to maintain and restore damaged communication circuits. During the conduct of the defense, communication personnel not engaged in operating communication facilities provide a mobile pool for the maintenance of communication.

149. COMMUNICATION DURING RELIEFS

When a regiment relieves another unit in an organized sector, the communication officer, accompanied by key communication personnel, precedes the regiment to become familiar with the communication system already in operation. Arrangements are made concerning the equipment and wire to be left on the position by the unit being relieved. During the reconnaissance, wire personnel familiarize them-

selves with all wire routes. The communication officer of the unit being relieved furnishes the incoming communication officer with a line-route map, circuit diagram, traffic diagram, and radio net diagram. The incoming communication officer obtains as much information as possible about road conditions and routes for messengers. He evaluates conditions that affect radio communication and the probable interruptions of wire communication. By mutual agreement between the communication officers, equipment requiring extensive installation is exchanged. The relieving unit takes over the communication system when responsibility for the area is assumed by its commander. When secrecy is imperative, the relieving unit adopts all measures necessary to prevent the enemy from discovering any change in the tactical situation. These measures include continuing the use of the call signs, frequencies, codes, and ciphers of the unit being relieved.

Section VII. COMMUNICATION DURING RETROGRADE MOVEMENTS

150. COMMUNICATION IN WITHDRAWAL FROM ACTION

a. General. Communication during withdrawals from action is characterized by detailed planning and close coordination. As many communication channels are maintained as the situation, available equipment, and restrictions imposed by higher headquarters permit. For general information on withdrawals from action, see FM 7-40.

b. During Daylight. A daylight withdrawal from action is not undertaken if the position can be held until nightfall. If the regiment is forced to execute such an operation, communication personnel establish, operate, and maintain communication facilities as during a night withdrawal from action. The circumstances under which a daylight withdrawal from action is made seldom permit planning and preparation in as much detail as is permitted in a night withdrawal from action.

c. During Darkness. A night withdrawal from action is characterized by deliberate planning, reconnaissance, and execution. The tactical plan and the communication plan are carefully coordinated. Plans are made to provide communication in the old position, during the movement to the rear, and within the new battle position or area in which the regiment is assembling.

- (1) Reconnaissance is made of the routes of withdrawal to determine what existing wire circuits may be used to provide communication to various assembly areas, march-control points, and between the forward and rear positions. Reconnaissance also is made of the rear position so that installations of the communication system may be established there as soon as practicable. Reconnaissance parties usually are limited in size and number, and the majority of the communication personnel included are from the wire section. The reconnaissance is conducted during daylight, and critical points

are marked or guides are placed so they may be found easily at night.

- (2) Existing communication facilities are maintained in the old position for use by the covering force. Command posts close on order or when taken over by the covering force. A minimum of communication personnel remains in the old position to operate the communication system used by the covering-force commander. Either the regimental communication platoon leader or the communication chief (communication sergeant) remains with the covering force to supervise communication. Unused wire lines are recovered or destroyed to prevent their early use by the enemy. Deceptive measures include the use of dummy radio stations in maintaining normal radio activity in the old position.
- (3) Messengers and wire are the principal means of communication used during the movement to the rear. Staff officers and liaison officers are used to provide maximum control during the movement. Whenever possible march-control points are provided with communication by tapping telephones on wire circuits already established to the rear. Radio silence is maintained within units during movement to the rear. Radio operators continue to listen on assigned frequencies. If secrecy becomes unimportant because of discovery of the withdrawal by the enemy, the higher commander directs the

lifting of radio silence to assure adequate control.

- (4) The majority of the regimental communication platoon precedes the main body to the rear position to establish communication facilities. If the tactical plan is to renew the defense at the rear position, a complete defensive wire system is established there. The wire lines between division and the old position are intercepted and connected to the regimental switchboard at the rear position. Radios continue to listen on assigned frequencies but remain silent until the regimental commander orders resumption of operation. If the withdrawal is to be followed by some other type of operation, only essential communication facilities are established within the regimental assembly area and to the outpost. Reconnaissance and plans for communication to be provided in the next operation are begun immediately.

151. COMMUNICATION IN DELAYING ACTION

In a delaying action, the communication system is similar to that used in the attack. Emphasis is placed on mobility. Wire lines perpendicular to the front are used for control of units during their movement to the rear. A wire system is installed at each successive position to include the battalions and the heavy mortar company. It is essential that wire communication between the artillery and the regiment be maintained. Full use is made of visual

means and motor messengers. Communication to distant, detached, and mechanized units is ordinarily limited to radio and messenger. Timely measures are taken for reconnaissance for and establishment of communication on successive delaying positions. New wire lines ordinarily are not laid for communication between successive positions.

Section VIII. COMMUNICATION WITH ATTACHED AND SUPPORTING UNITS

152. INFANTRY-TANK COMMUNICATION

Successful operation of the infantry-tank team depends, to a large extent, upon adequate communication between the elements of the team.

a. Radio communication is provided between foot troops and tank units when they are operating as a team. All rifle units are provided with radios for direct communication with individual tanks and tank units. The regiment can establish direct communication with the division tank battalion when required.

b. Wire communication between tank crews and personnel outside the tanks is available through the telephone handset on the rear of each tank. This handset is connected to the tank interphone system. Expedients may be used if additional wire communication with individual tanks is required.

c. The command posts of the tank company and its platoons are included in the regimental wire system in defensive or static situations. The regiment uses the division wire system for communication with the

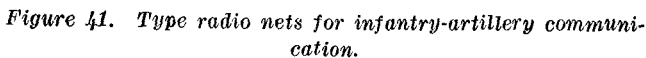
tank battalion. Messengers and liaison personnel are used between infantry and tank units.

153. INFANTRY-ARTILLERY COMMUNICATION

A light artillery battalion normally supports each infantry regiment. All means of communication are used between the infantry regiment and the supporting artillery.

a. The radio nets of an artillery battalion supporting an infantry regiment generally parallel those of the supported regiment (fig. 41). Artillery forward observers with front-line rifle companies are provided with lightweight portable radios that may be operated in the command nets of the rifle companies. They use another portable radio for communication with the artillery fire-direction center and with the artillery liaison officers at the infantry battalion and regimental command posts. Radio equipment organic to the infantry regiment permits direct radio communication between the regiment and the command posts of the artillery battalion and division artillery headquarters.

b. Direct wire communication is established between the command posts of a supporting artillery battalion and the infantry regiment (fig. 42). Wire lines also are laid from the artillery battalion command post to telephone centrals established by artillery liaison sections at the command posts of front-line infantry battalions. These telephone centrals are connected to the switchboards operated by the infantry battalions. Forward observers communicate with the artillery battalion fire-direction center



189

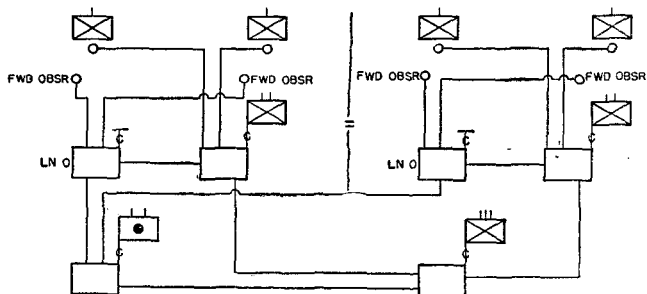


Figure 42. Type wire system for infantry-artillery communication.

communication facilities for the conduct of fire missions.

c. Messengers are used between infantry and artillery units. Pyrotechnic signals with prearranged meanings may be used to supplement the electrical means in controlling artillery fire. Signals normally are prescribed in the SOI for lifting and calling for artillery fire.

154. INFANTRY-ANTIAIRCRAFT ARTILLERY COMMUNICATION

An automatic weapons battery of the division anti-aircraft artillery battalion may support the infantry regiment by providing local antiaircraft defense. It may also be used for ground support of front-line infantry units. Communication is required between the AAA battery and the supported infantry regiment.

a. When an automatic weapons battery supports an infantry regiment, radio communication is es-

established between the command posts of the two units, using frequency-modulated voice radios. When an automatic weapons platoon supports a front-line infantry battalion, it operates a radio in the command net of the battalion. This provides direct radio communication between the AAA platoon and all companies in the infantry battalion.

b. Wire communication may be established between the AAA battery and the infantry regimental command post. Telephones available to AAA platoons may be connected to infantry battalion switchboards, particularly in static situations.

c. The command post of an AAA unit usually is located in the vicinity of the command post of the supported unit. Messengers and liaison agents also are used between AAA and infantry units.

155. INFANTRY-ENGINEER COMMUNICATION

Communication is established between the infantry regiment and supporting engineers. All practical means of communication are used.

a. When an engineer company from the division engineer combat battalion is attached to an infantry regiment, it operates a radio set in a regimental command net. Engineer platoons may communicate with infantry battalions by portable radios organic to the platoons. The assault platoon of the headquarters and service company, engineer combat battalion, is equipped with radios capable of communicating with appropriate elements of the infantry regiment, including the tank company, infantry battalions, and rifle and heavy weapons companies.

b. Wire communication is established between the engineer company and the supported infantry regiment. Other wire lines between elements of the engineer company and infantry units may be laid.

c. Liaison personnel, designated by the engineer company commander, operate between infantry and engineer units. Messengers also are used between infantry and engineer units.

CHAPTER 6

AIRBORNE INFANTRY REGIMENT

Section I. GENERAL

156. ORGANIZATION

The organization of the airborne infantry regiment is similar to that of the infantry regiment (fig. 43). The airborne infantry regiment contains a support company in lieu of the tank company and the heavy mortar company organic to the infantry regiment. The support company consists of a company headquarters, two heavy mortar platoons, and an antitank platoon. Other minor differences exist in the organization of the airborne and infantry regiments. Communication personnel in the two units generally are the same.

157. COMMUNICATION, GENERAL

a. This chapter deals with aspects of communication peculiar to the airborne infantry regiment. Most of the communication difficulties that confront the airborne infantry regiment result from conditions that prevail during and immediately after an initial assault by parachute and glider elements. They are brought about by the nature and magnitude of the missions assigned to the airborne infantry regiment and the difficulty in regaining command control

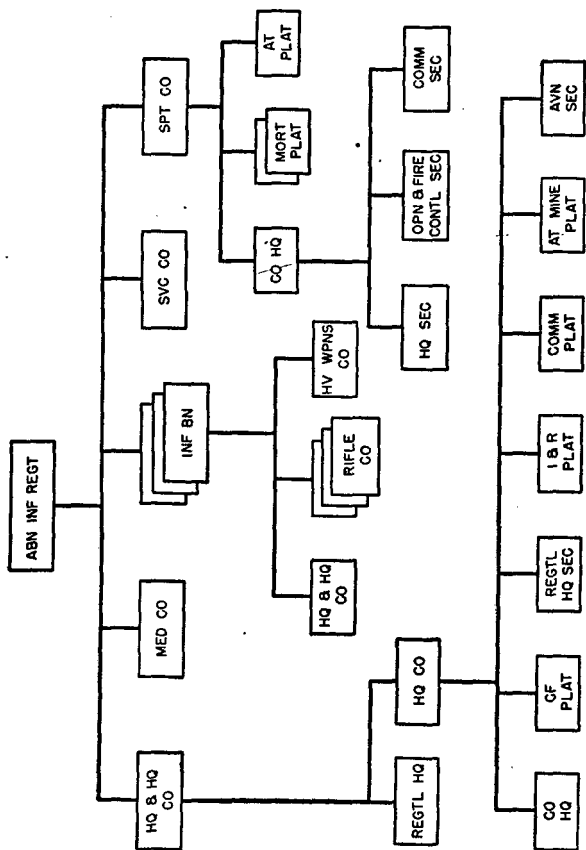


Figure 43. Organization of the airborne infantry regiment.

once the regiment has landed in the objective area (par. 85).

b. Following accomplishment of initial missions assigned to assault units, the airhead is consolidated. The build-up of the airhead proceeds concurrently with the seizure and organization of the airhead line. During sustained ground operations, the installation, operation, and maintenance of the regimental communication system follow, in general, the procedures outlined for an infantry regiment in chapter 5.

158. COMMUNICATION IN THE SUPPORT COMPANY

a. The support company is organic only to the airborne infantry regiment. The communication section in the company is similar to that in the heavy mortar company in the infantry regiment. It is commanded by the communication chief whose duties are similar to those of a communication officer in a higher unit.

b. Wire is the principal means of communication in the company when it can be installed and maintained. It is preferred in controlling the fires of the mortar platoons. The antitank platoon headquarters and the antitank sections are usually included in the regimental wire system. The switchboard is installed at the company command post, which normally is located near the fire-direction center. Company linemen, assisted by mortar platoon personnel, lay wire lines to the mortar platoons, observation posts, and the mortar positions. Company linemen also install

local telephones for the platoon commanders and the fire-direction center (fig. 44). Wire communication with the antitank platoons normally is established through the regimental wire system because of the manner in which the platoons are employed. Elements of the antitank platoons are disposed to provide the most effective antitank defense for the regiment. They are usually connected to the regimental wire system through the nearest switchboard. Responsibility for laying wire lines depends upon whether elements of the platoons are attached to battalions or remain under company control (par. 5). Flexibility in the establishment of wire communication is essential. The manner in which it is established varies according to the tactical requirements.

c. The company operates radio sets in each of the two regimental command nets. Portable voice radios are used for communication within the company. Separate radio nets are established, one for the two mortar platoons, and one for the antitank platoon (fig. 45). The mortar net is established primarily for fire control. It is not operated when wire communication is available. This net includes radios at the observation posts, fire-direction center, and the mortar positions. It also may include the company commander and the reconnaissance officer when they are away from the command post. The antitank platoon net consists of a radio at the platoon headquarters and one at each of the antitank sections. A radio at the company command post operates in the antitank platoon net when radio communication is required. The composition of the antitank platoon net is dependent upon the employment of the platoon. If

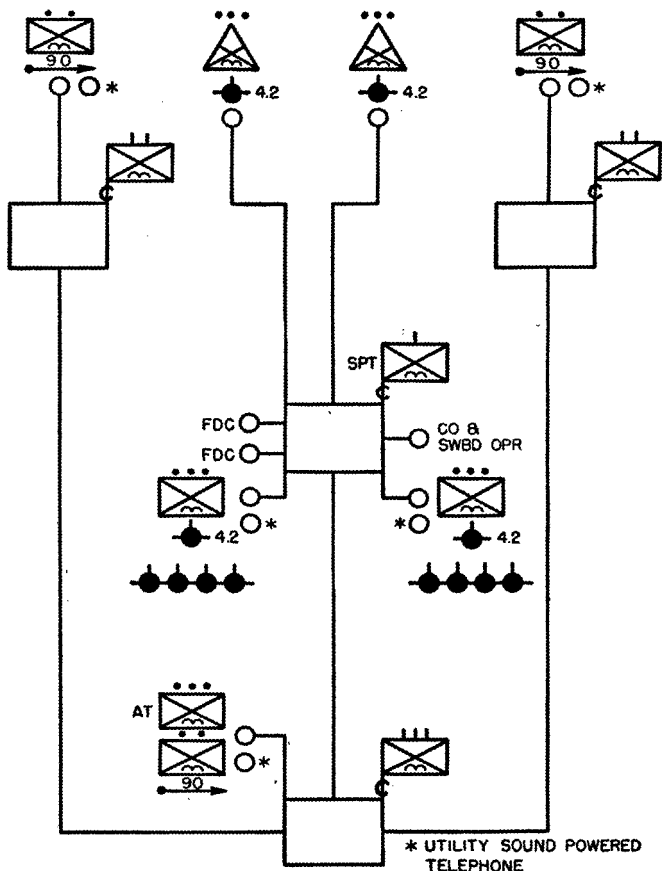


Figure 44. Type wire system for a support company utilizing the regimental wire system for communication with elements of the antitank platoon.

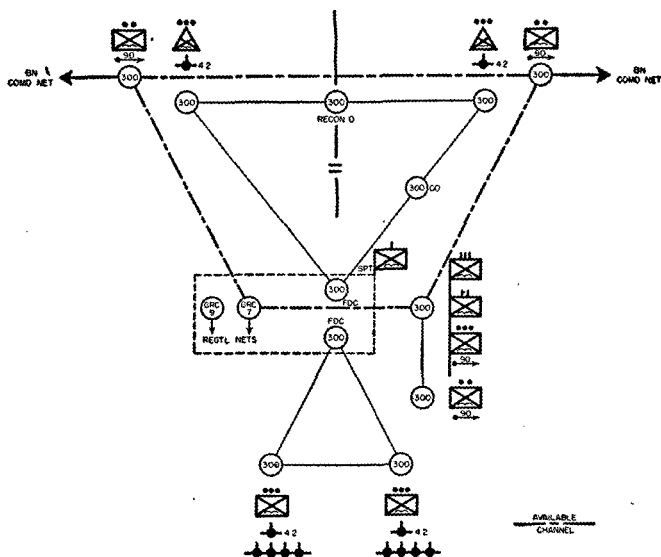


Figure 45. Type radio nets for a support company.

antitank sections are attached to battalions, they operate their radios in the command nets of the battalions.

d. The use of messengers, visual, and sound communication in the support company is similar to its use in other infantry units.

159. PLANNING COMMUNICATION FOR AN AIRBORNE OPERATION

Upon being alerted for an airborne operation, the airborne infantry regiment commences detailed planning. Its plans are based upon and conform to the plans of the higher commander. The communi-

cation plan of the regimental communication officer is coordinated with the plan of the signal officer. The information of communication planning given in paragraph 85 is generally applicable to the airborne infantry regiment as well as the airborne division signal company.

Section II. COMMUNICATION DURING AIRBORNE OPERATIONS

160. GENERAL

Communication during the marshalling and air movement phases and at base camps during operations is explained in chapter 3. While the airborne infantry regiment is engaged in sustained ground operations, the employment of the means of communication is similar to that described in chapter 5.

161. COMMUNICATION DURING THE ASSAULT PHASE

a. Communication Equipment. The size, weight, and amount of equipment landed with the parachute element of the regiment are limited. Only equipment that may be carried by the individual jumper or consigned to equipment containers is available initially. Such equipment includes portable voice radios and batteries, field telephones, wire, panels, and lightweight switchboards. Heavier general purpose radios are broken into component parts and carried on the persons of two or more jumpers. Reserve supplies of equipment are provided to com-

pensate for probable losses during the landing. The communication officer assures himself that resupply plans include sufficient equipment and supplies to meet communication requirements.

b. Communication Personnel. Communication personnel are assigned throughout air serials. A radio operator assigned to a unit commander or to a staff officer is placed in the stick near the officer. Drivers of communication vehicles remain with their vehicles and move to the objective area with them.

c. Assembly After Landing. After landing, each communication officer joins his unit commander and staff to acquaint himself with the tactical situation and to receive any additional information and orders. This permits him to vary the use of the communication facilities at his disposal to meet the requirements of the situation. The regimental communication platoon leader is charged with assembling his platoon. The platoon, less radio operators, wire teams, and messengers having special assignments, normally assembles with the regimental headquarters company. The platoon leader reports the status of his personnel and equipment to the communication officer as soon as practicable. He directs the establishment of communication in accordance with the communication plan until such time as the communication officer gives him additional information and orders. Battalion communication platoons assemble under the direction of the battalion communication chief whose actions are similar to those of the regimental communication platoon leader. Other communication personnel assemble with their units and proceed

to carry out their communication missions. Command posts are established immediately in their predetermined locations. If this is not possible, a guide is sent to the designated location to direct messengers. Messengers are exchanged after units have assembled and command posts are established.

d. Means. During the assembly and reorganization of the regiment after landing, radio is the principal means of communication (figs. 46 and 47). It is supplemented by messengers and other means to a lesser degree. The installation of the wire system is started as soon as practicable. The airborne regiment wire laying teams and their equipment from the regimental communication platoon may be dropped with the battalions. Command radio nets are opened immediately after landing to facilitate control and to expedite assembly. Portable radios are habitually jumped on the individual commanders or operators to facilitate prompt opening of radio nets on landing. Radio communication to the next higher commander is established immediately after landing. Communication with cooperating aircraft and naval forces is provided through tactical air-control parties and naval gunfire teams.

e. After Reorganization. Reorganization cannot be considered complete until the regiment has assembled according to plan and command fire-control communication channels are established. After the initial airborne assault and the build-up of troops and equipment, the employment of the communication means is similar to that described in chapter 5.

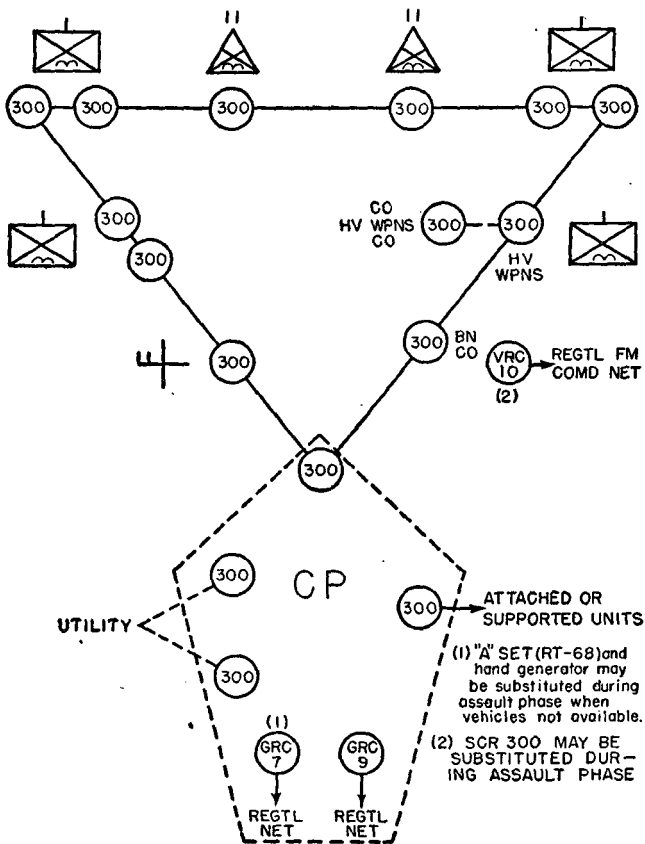
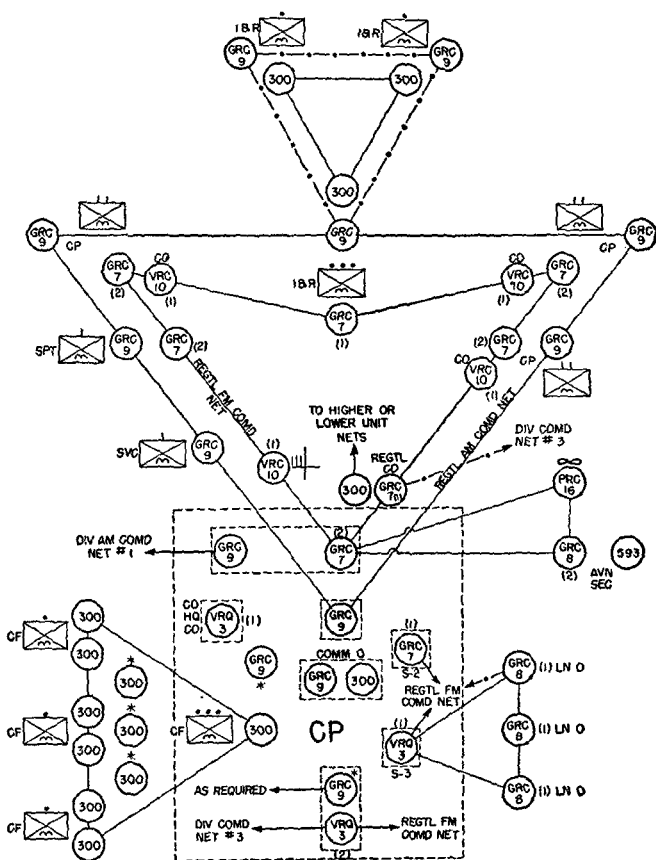


Figure 46. Type radio nets for an airborne infantry battalion.



(1) SCR 300 MAY BE SUBSTITUTED DURING ASSAULT PHASE.

(2) "A" SET (RT-69) AND HAND GENERATOR MAY BE SUBSTITUTED DURING ASSAULT PHASE WHEN VEHICLES ARE NOT AVAILABLE.

* UTILITY
CF COUNTERFIRE
AVAILABLE
CHANNEL

Figure 47. Type radio nets for an airborne infantry regiment.

CHAPTER 7

ENGINEER COMBAT BATTALION, INFANTRY DIVISION

Section I. GENERAL

162. ORGANIZATION

The engineer combat battalion, infantry division, consists of a headquarters, a headquarters and service company, four lettered companies, and a medical detachment. The headquarters and service company includes a communication section commanded by the battalion communication chief. The section installs, operates, and maintains communication facilities for the battalion headquarters under the immediate supervision of the communication officer who is a member of the battalion commander's special staff. Limited numbers of communication personnel are assigned by Tables of Organization and Equipment to the headquarters of the lettered companies. Much of the authorized signal equipment in the battalion has to be operated by designated personnel in addition to their normal duties.

163. NEED FOR COMMUNICATION

Engineer squads, platoons, and companies frequently are separated from their parent units by appreciable distances. For example—

a. The command post of the engineer combat battalion normally is situated in the vicinity of the division command post.

b. An engineer company may be away from the battalion in support of an infantry regiment for indefinite periods.

c. An engineer platoon may be a considerable distance from its company to repair a bridge.

d. An engineer squad may be building a bridge approach by itself across a river from the rest of the platoon.

These separations present definite problems in establishing and maintaining communication between engineer units. Communication is required for proper functioning, particularly for the transmittal of reconnaissance information and work progress reports.

164. WIRE COMMUNICATION

a. The engineer combat battalion uses wire communication wherever possible. A wire construction team from the division signal company lays a line from division to the battalion command post. The battalion communication section establishes wire communication facilities for the battalion headquarters. See figure 48. Wire communication is normally established with all companies in the battalion. Direct lines may be laid to the companies if the distances involved are not excessive. If the companies are located so far away that laying direct lines to them is not feasible, wire communication with the engineer battalion normally is established through the division wire system from the switchboards of nearby divi-

sional units. Maximum use is made of existing military or commercial wire facilities. Sound-powered telephone equipment is used to provide wire communication within headquarters and service company.

b. Small units use wire communication for controlling traffic through mine fields or defiles, controlling the construction of bridges, and coordinating working parties. Sound-powered telephone equipment is available in engineer companies for such uses.

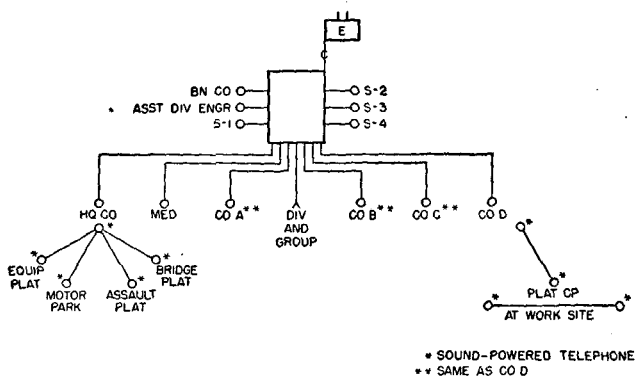


Figure 48. Type wire system for an engineer combat battalion.

165. RADIO COMMUNICATION

a. Radio communication is used extensively in the battalion. Typical uses of radio in engineer units include—

- (1) Command and control of lower units.
- (2) Reporting progress of work parties.
- (3) Transmitting information from engineer reconnaissance teams to nearby units, or to

engineer company and battalion commanders.

- (4) Directing traffic during construction of a bridge or road, or through a mine field—an engineer unit supporting another unit contacts the supported unit and coordinates communication. An engineer company or platoon may be directed to operate a radio in a net of the supported unit. Typical radio nets established in the engineer combat battalion are shown in figure 49.

b. An engineer battalion radio set operates in a division command net. The battalion command net normally includes a radio at the battalion command post, one at each company command post, one with the bridge platoon, and one with each team in the reconnaissance section. Radios provided for the battalion commander (division engineer) and the assistant division engineer also may be included in this net.

c. Each lettered company operates a command net that includes the radios at the company command post, the company maintenance section, and each of the platoons. The company commander is provided with a radio for operation in this net while he is away from the command post. Each platoon in lettered engineer companies operates a command net that includes the platoon headquarters and all squads.

d. The assault platoon of the headquarters and service company may operate a radio net for inter-tank communication. Each tank dozer is equipped with a radio capable of operating in the command nets of engineer companies and infantry battalions and with all tank units in the infantry division.

166. MESSENGER, VISUAL, AND SOUND COMMUNICATION

a. Since the engineer combat battalion is not authorized any messengers by tables of organization and equipment, designated personnel are trained to perform the duties of messengers in addition to their normal duties. Messages that must be transmitted by messenger frequently are sent on transportation going for some other purpose or in the vicinity of the addressee. For further information on messenger communication, see paragraph 29.

b. Visual signaling is used in accordance with current instructions. Panel sets are issued for marking positions and identifying units as friendly. For further information on visual communication, see paragraph 30.

c. Sound communication is used in accordance with current instructions. For further information on sound communication, see paragraph 31.

167. COMMUNICATION WITH SUPPORTING ENGINEER COMBAT GROUP

A supporting engineer combat group normally establishes and maintains communication with the supported division engineer battalion. The group operates a radio in the command net of the division engineer battalion. This provides simultaneous contact with the division engineer and the engineer battalion. Wire communication between the supporting group and the division engineer battalion is established through the division or corps wire

system, depending upon the location of the command post of the group.

Section II. TACTICAL APPLICATION OF COMMUNICATION

168. GENERAL

The communication system of the engineer combat battalion is flexible. Its composition is primarily dependent upon the disposition and employment of the battalion's lower units. Different types of tactical operations have relatively little effect on the use of the communication means. The signal equipment available to the battalion may not be adequate to provide communication at all times. In such cases, assistance is requested from the division signal company or the supporting engineer combat group. Communication methods in various types of special operations are covered in chapter 12.

169. COMMUNICATION DURING CONCENTRATION

In a concentration area, the engineer combat battalion established only essential communication facilities. Maximum use is made of existing commercial wire facilities. Radios are silenced if secrecy is imperative.

170. COMMUNICATION DURING MARCHES AND HALTS

a. Marches. During division marches, the battalion may either move as a unit or engineer elements

may move with other divisional units. When the battalion moves as a unit, it maintains communication with the division command post and with lower units. Radio is the principal means of communication unless it is silenced for security reasons. Motor and aircraft messengers are used to supplement radio communication. Contact with lower units enables the battalion commander to transmit information and instructions to them and redispense units to meet unforeseen contingencies that arise. When an engineer unit supports and moves with another divisional unit, it maintains communication with the supported units. Usually, radio is operated in the command net of the supported unit, and a liaison officer or messenger travels with the march command post.

b. Halts. During temporary halts, communication is maintained as during the march. During prolonged halts when the battalion is marching as a unit it occupies its own bivouac area and maintains communication as during the march. Wire communication normally is established with higher and lower units. Wire communication may be established between an engineer company and the infantry regiment it is supporting.

171. COMMUNICATION DURING DEVELOPMENT

During development, engineer troops are disposed to help other units in overcoming obstacles. Command relationships are specified by the division commander on the recommendation of the division engineer. Communication requirements are similar to those during marches.

172. COMMUNICATION DURING THE ATTACK

a. For the attack, engineer troop dispositions are evolved directly from the formations and troop assignments specified for the development. Any necessary changes are made as the attack progresses. Engineer elements are in constant contact with the engineer battalion and with the supported unit. The communication requirements given in paragraph 171 also apply to attacks over terrain that present no formidable obstacles.

b. At defiles, such as narrow bridges, cratered roads, and lanes through mine fields, communication facilities are established to control traffic, to pass on information about the progress of work parties, and to request necessary personnel, supplies, and equipment from the engineer battalion headquarters. Since these bottlenecks generally are temporary, radio, messenger, and visual communication normally are used. Any existing wire facilities are used.

173. COMMUNICATION DURING REORGANIZATION

Reorganization is carried out during combat to replace casualties, reassign personnel if necessary, and replenish supplies and equipment. Communication within the engineer battalion is of primary importance, but presents no significant problems since the battalion elements are occupying relatively stable positions. Communication requirements are similar to those described for halts (par. 170).

174. COMMUNICATION DURING PURSUIT

During pursuit, engineer duties are a combination of those required during movement to contact and during the attack. Communication requirements vary considerably, but are similar to those described in paragraphs 170 to 172. Communication facilities must be available for the transmittal of engineer reconnaissance reports to the battalion command post.

175. COMMUNICATION DURING DEFENSE

In the defense, engineer missions include active support of front-line units and general work throughout the division sector. Communication requirements include maintenance of contact with battalion elements, with division headquarters, and with supported units. In addition to using radio and wire communication, contact with supported units is augmented by liaison personnel. Engineer elements usually are included in the radio and wire systems of the supported units. Engineer command posts and message centers are established near their major engineer effort. The supporting engineer combat group maintains contact as described in paragraph 167.

176. COMMUNICATION DURING COMBAT AS INFANTRY

When employed as infantry, the engineer combat battalion functions like an infantry battalion and requires similar communication facilities. Reorgan-

ization of engineer units for combat as infantry is discussed in FM 5-6. The battalion functions with a forward and a rear echelon, and the wire and radio systems shown in figures 48 and 49 are generally applicable. Communication is established with supporting artillery as covered in paragraph 153.

177. COMMUNICATION DURING RETROGRADE MOVEMENTS

Engineers assist other units during withdrawals and delaying actions. Since the time schedule for these operations must be strictly followed, engineer elements stay in close contact with supported units for coordination and unity of command. Engineers continue to maintain wire and radio communication with the supported units and establish communication at each major obstacle they plan to execute. In addition, engineer elements maintain contact with their parent units as described in paragraph 170. Communication assistance from the supported unit and the battalion communication section may be requested. Motor messengers are available for emergencies. Limited communication facilities are established at delaying positions, the extent of installations depending upon how long each position is to be occupied.

CHAPTER 8

ENGINEER BATTALION, AIRBORNE DIVISION

178. ORGANIZATION

The airborne engineer battalion is an organic part of the airborne division. It consists of a headquarters, a headquarters and service company, three lettered companies, and a medical detachment. It is organized and equipped to perform general engineering tasks during airborne operations as well as sustained ground operations.

179. COMPARISON WITH ENGINEER COMBAT BATTALION, INFANTRY DIVISION

In comparison with the engineer combat battalion, infantry division, the airborne engineer battalion has fewer officers and men, one less company, and no assault platoon. It also has fewer communication personnel and less equipment, since it has one less company and no engineer armored vehicles. The principal difference between the operations of the engineer combat battalion, infantry division, and those of the airborne battalion is in the method of transportation to the tactical site. Once the airborne engineer battalion has landed and assembled in the objective area, or has been committed in ground com-

bat, its operations are similar to those of the engineer combat battalion, infantry division.

180. TACTICAL APPLICATION OF COMMUNICATION

The special conditions peculiar to airborne operations discussed in chapters 3 and 6 are also applicable to the airborne engineer battalion. Upon landing, all units use their signal equipment to facilitate assembly. The tactical use of communication facilities in the airborne engineer battalion, after units have assembled, is similar to their use in the engineer combat battalion, infantry division as discussed in chapter 7. See figure 48 for type wire net applicable to both infantry and airborne divisions; see figure 50 for type radio nets of the airborne engineer battalion.

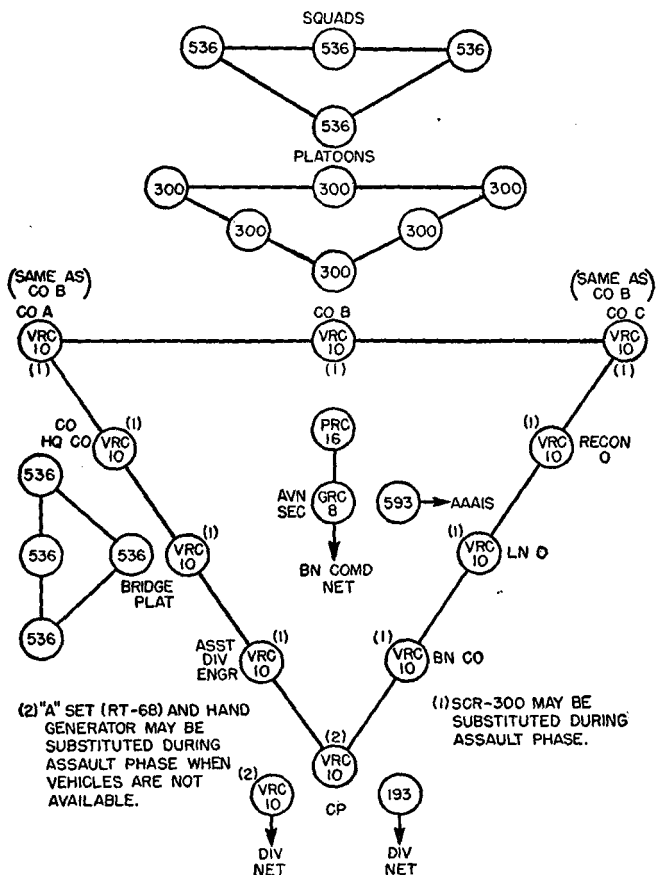


Figure 50. Type radio nets for an airborne engineer battalion.

CHAPTER 9

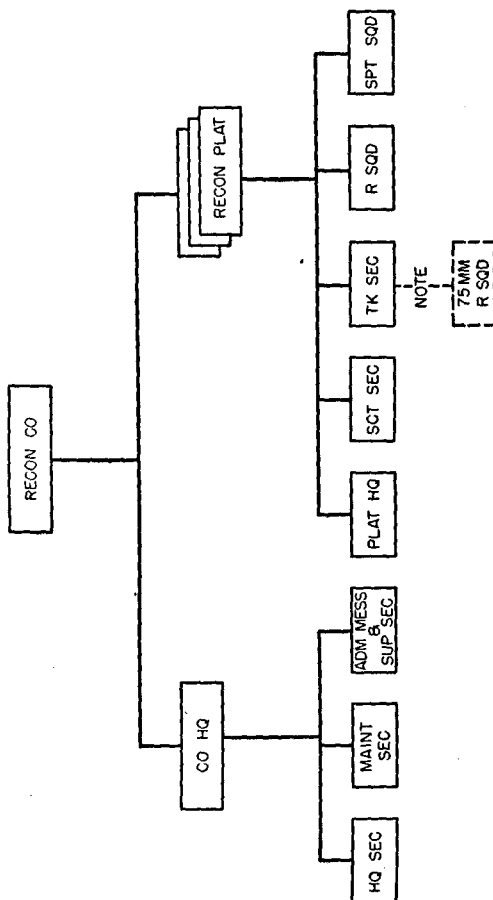
RECONNAISSANCE COMPANY

Section I. GENERAL

181. ORGANIZATION

a. The reconnaissance company, organic to both the airborne and infantry divisions, is organized as shown in figure 51. It is a self-sufficient tactical and administrative unit. It is organized to perform security and reconnaissance missions during offensive and defensive combat. The company operates directly under the division commander or is attached as he directs. The characteristics of the company include rapid mobility, heavy automatic fire power, flexible and versatile organization, and multiple communication. In addition the reconnaissance company of the infantry division has vehicles which provide light armored protection.

b. A limited number of communication personnel are authorized by tables of organization and equipment; however, practically all communication is provided by using personnel in addition to their other duties. The company executive officer usually performs the duties of a communication officer in addition to his other duties. He is assisted by the communication chief (communication sergeant).



NOTE: 75MM R SQD ORGANIC TO RECONNAISSANCE
COMPANY AIRBORNE DIVISION. TK SEC ORGANIC
TO RECONNAISSANCE COMPANY INFANTRY
DIVISION.

Figure 51. Organisation of the reconnaissance company.

182. WIRE COMMUNICATION

Limited amounts of field wire and wire equipment are issued to the company. Additional wire equipment is requested from division when needed. Division establishes wire communication with the reconnaissance company (fig. 6).

183. RADIO COMMUNICATION

a. Radio is the principal means of communication used by the company. Both amplitude-modulated and frequency-modulated radio sets are provided. The amplitude-modulated sets are available for long-range communication, while the frequency-modulated voice radios are used principally for communication within the company.

b. Radio nets of the infantry division reconnaissance company (fig. 52) and the airborne division reconnaissance company (fig. 53) are similar. The company command nets of both companies include the radio sets of the platoon leaders of the three reconnaissance platoons, company headquarters, and company maintenance radio sets. These nets are used for controlling the company and for the transmission of information within the company. Usually, a reconnaissance platoon acts as a unit and only the platoon leader's set operates in the company command net. The other platoon sets usually are operated in the platoon command net. The platoon nets usually operate on separate channels and provide a means for the transmission of information and orders within the platoons.

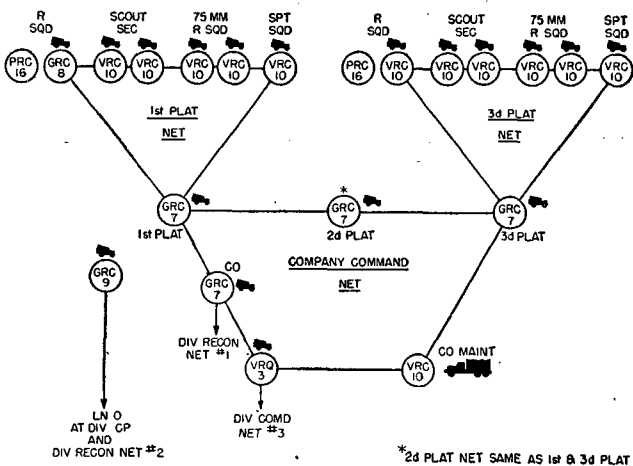


Figure 53. Type radio nets for the reconnaissance company, airborne division.

pany commander and the liaison officer who stays at the command post of the infantry regiment.

184. MESSENGER COMMUNICATION

Although no messengers are provided by tables of organization and equipment, messenger service is a principal means of communication in the reconnaissance company. Designated personnel are trained to perform the duties of messengers in addition to their other duties. All operation orders of the company commander include alternate plans for communication to include the use of messengers. Certain administrative reports are delivered at one time by scheduled messenger. If radio communication becomes ineffective, it may be necessary to use

personnel and vehicles from the reserve and light aircraft to maintain adequate messenger service.

185. VISUAL AND SOUND COMMUNICATION

a. Panel sets are provided for air-ground communication between company headquarters and aircraft. Other panel sets are issued to all elements of the company for air-ground recognition. Flag sets are provided for signaling between vehicles and for column control. Other methods of visual signaling may be used in accordance with current instructions.

b. Sound is used only as an emergency means of communication.

186. STANDING OPERATING PROCEDURE

The use of SOP's (including formations and standard methods of operation) reduces the volume of radio traffic incident to control, and insures that radio nets are available for the transmission of essential traffic. The company SOP also provides a plan for the handling of administrative message traffic and covers the use of messengers. Plans for the use of communication facilities in the company must be simple and understood by all personnel concerned.

Section II. TACTICAL APPLICATION OF COMMUNICATION

187. GENERAL

The reconnaissance company performs a number of varied missions to which its communication facilities are quickly and effectively adaptable. Radio

and messenger communication available to the company lend themselves to a flexible communication system which may easily be adapted to any situation. The net organization, as shown in figure 46, provides radio communication which may be adapted to any combination of teams of platoons at short or long range. An alternate plan for communication is necessary for use when radio communication fails or when radios are silenced for security reasons.

188. COORDINATION WITH OTHER UNITS

a. Front Line Infantry. A function of the reconnaissance company is to provide the division with information essential to the accomplishment of its mission. It is necessary for the company to coordinate communication with front-line infantry units to get information for them. This may be accomplished by dispatching messengers or, if available, liaison agents equipped with radios, direct to the front-line infantry units to give them detailed information. Infantry commanders may attach elements of their intelligence and reconnaissance platoons to elements of the reconnaissance company working in their immediate vicinity to insure their prompt receipt of all information gained.

b. Lateral and Front-to-Rear. When the reconnaissance company reconnoiters in zones adjacent to or behind other reconnaissance units, coordination of communication both laterally and from front to rear is required. The coordination normally will be ordered by the higher commander, but may be accomplished by the communication officer or the

company commander. Liaison may be accomplished by radio, contact patrols, lateral contact on phase line, or exchange of liaison agents.

189. USE OF COMMUNICATION FACILITIES

The efficient operation of communication facilities during reconnaissance and security missions is essential. Radio stations monitor continuously to keep all teams abreast of the situation. Training in the use of SOP's, arm-and-hand signals, and flag signals minimize the volume of radio and messenger traffic for the internal control of the platoon and company. Specific missions detailed in operation orders, based on terrain and map study, insure efficient use of communication facilities. An understanding of the mission also reduces the amount of traffic and allows immediate transmission of information of the enemy and terrain.

190. COMMUNICATION WHILE MOVING

When the company is moving, the means of communication are generally limited to radio and messenger. When contact is made, reconnaissance is performed largely by dismounted patrols and observation posts. Contact with the division command post and other infantry units may be made by tapping in on the nearest infantry wire lines. When a number of observation posts are in operation, accuracy in observation is promoted and errors avoided if the observation posts are in radio or wire communication with one another.

CHAPTER 10

TANK BATTALION

Section I. GENERAL

191. ORGANIZATION

a. One medium tank battalion is organic to the infantry division. Two such battalions are organic to the airborne infantry division. Each consists of a headquarters, a headquarters and service company, three tank companies, and a medical detachment. The headquarters and service company includes a battalion headquarters platoon, a reconnaissance platoon, a supply platoon, a maintenance platoon, a battalion administrative and personnel section, and a company headquarters. The tank company includes a company headquarters and four tank platoons, each having five tanks.

b. The communication officer is also the assistant S-3 for air. He supervises all communication training within the battalion, including air-ground cooperation procedures. His duties include supervision of the installation, operation, and maintenance of the battalion communication system (par. 8).

192. RADIO COMMUNICATION

a. Radio is the principal means of communication within the tank battalion. It is used for tactical

control, fire control, administration, and liaison between and within units. Because of its flexibility and mobility, radio is used between rapidly moving units, over extended areas, and between air and ground where wire and other means are impractical.

b. Radio equipment in the battalion includes both amplitude-modulated and frequency-modulated radio sets. Long range, amplitude-modulated sets are available for command and administrative purposes between the battalion and higher commanders. Frequency-modulated sets are used for voice radio communication, between and within all units of the battalion, and between the battalion and higher, supporting, supported, and adjacent units. A very-high-frequency, amplitude-modulated radio is used for air-ground communication with tactical aircraft. It is usually operated by the forward air controller provided by the air force. Short range, frequency-modulated sets are used for communication between tanks and dismounted infantry. Radios in light aircraft are employed in the battalion command net (par. 28).

193. WIRE COMMUNICATION

Wire does not, in general, lend itself to use by the tank battalion. However, a limited amount of wire equipment is available to the tank battalion. Although wire cannot be used while the battalion is moving, its use is advisable while the battalion is in bivouac, in an assembly area, and engaged in defensive operations (par. 27).

194. MESSENGER COMMUNICATION

Each messenger authorized in tables of organization and equipment drives a vehicle. Additional personnel are designated and trained to perform the duties of messengers (par. 29).

195. VISUAL COMMUNICATION

Visual communication used in the tank battalion includes signals transmitted by arm and hand, flags, panels, pyrotechnics, colored smoke, and improvised lights. Arm-and-hand signals and identification panels supplement radio and other communication means. Other methods of visual communications are used only for special purposes (par. 30).

196. SOUND COMMUNICATION

In the tank battalion, sound communication is used only as an emergency means (par. 31).

Section II. COMMAND POSTS

197. GENERAL

For mobile and efficient conduct of combat operations, the headquarters of the tank battalion is subdivided into three echelons—the commander's echelon, the forward echelon, and the rear echelon. The command post is located at the forward echelon.

a. The *commander's echelon* consists of the commander, the operations officer, and one or more vehicles equipped with command radio facilities. Its purpose is to directly supervise the execution of oper-

ations, render prompt decisions for changes in plans, receive reports from the forward echelon, and keep higher commanders informed of the situation through the forward echelon. It remains highly mobile and well forward during operations. In battle, the commander is generally accompanied by the S-3 for air, or a forward air controller, and the supporting artillery commander or his liaison officer. The commander's echelon can quickly and directly influence the course of battle. By its forward location, it is capable of directing the exploitation of successes immediately and to the maximum extent. The commander's echelon normally operates in advance of the forward echelon, in the vicinity of the forward combat elements. Its location is not fixed and may change frequently, as the situation develops. At the close of the day's operations or as the commander desires, the commander's echelon joins the forward echelon.

b. The purpose of the *forward echelon* is to operate and maintain communication with higher, adjacent, supporting, supported, and lower units; to make reports to the commander's echelon on new developments pertinent to the situation; to plan future operations; to provide for liaison with adjacent and higher units; and to supervise liaison with supporting, supported, and lower units. The forward echelon is located to maintain communication with the commander's echelon, forward elements, and the higher commander. Security derived from adjacent combat troops, cover and concealment, ease of camouflage, availability to traveled routes, avoidance of prominent terrain features that may attract

artillery fire, and hard standing for vehicles are considered in locating the forward echelon.

c. The purpose of the *rear echelon* is to perform administrative and logistical functions for the command and to dispatch information pertaining to these functions to the forward echelon. The rear echelon is located with the field trains. Communication with the forward echelon is important to the rear echelon. Because of the distances involved, the rear echelon frequently communicates with the units through the forward echelon.

198. ORGANIZATION AND INTERIOR ARRANGEMENT

a. The command post may be located in buildings, woods, or fields. All arrangements provide for prompt displacement. Once completely established, the maximum time necessary to initiate movement of the battalion command post is 30 minutes. During combat, the tank battalion command post usually operates from vehicles. To enable visiting personnel, liaison officers and agents, and messengers to find its location without unnecessary delay, approaches to the command post are clearly marked with direction signs, and guides are posted at critical points. A guide is stationed at the entrance to the command post with a diagram of the location of staff sections. In addition, a member of the headquarters commandant's section is available to escort visitors to the commander or staff sections. The staff sections are plainly marked, and approaches to them are marked with direction signs.

b. Armored command posts are highly mobile and contain many vehicles. To insure prompt and orderly movement both into and out of command posts and to assist visitors to find the staff sections they desire, standard interior arrangements are used. Such arrangements include—

- (1) Locating the message center near the entrance to the command post.
- (2) Centrally locating near each other the offices of the commander, executive officer, and liaison officers.
- (3) Locating the operations and intelligence sections near each other.
- (4) Grouping the personnel and supply sections near each other.

199. MOVEMENT

a. *General.* To control the movements of the combat elements, the command post of the tank battalion stays well forward. Frequent moves are necessary not only for control but also for security. A command post that is allowed to remain in place while combat elements move loses its protection, and the commander either attaches combat units to it or has its position compromised by enemy action. The necessity for frequent changes of location requires the battalion to be equipped with command post vehicles having radios, map boards, interior lights, and provisions for blackout to stay in operation while moving. These vehicles are not only necessary to the tank battalion for operations while en route but also when the command post halts. The primary role

of armor requires command posts to be so organized that extensive preparations are not essential for efficient operation.

b. Planning. Adequate preplanning insures orderly and efficient movement of the command post. The general location for the new command post is prescribed by the commander, the exact location being determined by a ground reconnaissance by the S-1 or the headquarters commandant. A billeting party (composed of representatives from each staff section and from headquarters and service company) joins the headquarters commandant before the command post column arrives. The party arrives in sufficient time to designate and mark locations for elements of the command post and assists in guiding the headquarters into its new location promptly.

c. Operations While Moving. The moving command post presents problems that are not normal to fixed command post operations. To be able to continue efficient functioning while en route requires adequate mobile equipment, forethought, and proper planning. Many of the aids present in a fixed installation are not available when the command post is moving. Among these are telephones, foot messengers, and personnel liaison. Radio, motor messengers, and visual means are the usual methods of communication while on the move. No unusual problem exists in operating radios en route, but motor messengers may experience difficulty in passing columns to deliver messages. Plans are prepared to include in the command post vehicle the necessary personnel for efficient operation. Voice radio provides interior command post communication while en route. Staff

officers are equipped to receive radio messages and conduct operations during movement. The command post column moves in a fixed formation to facilitate the departure from the old location, the delivery of messages en route, and the re-establishment of the command post on arrival at the new location. All key vehicles are plainly marked with the appropriate section designation.

200. AXIS OF SIGNAL COMMUNICATION

As the troops advance, the command posts follow. Command posts of small units, such as platoons and companies, move more frequently than those of larger units, but the probable future locations of the command post of any unit forms its axis of signal communication. In planning an axis of signal communication, command post locations are selected with a view to movement with reasonable time. Timely movement of a command post is essential, but needless shifting places an unnecessary burden on both the staff and the communication personnel and leads to confusion and loss of control during the move. For this reason, the communication officer keeps informed of the general zone or proposed route of advance to allow him to make recommendations for the location of command posts.

Section III. TACTICAL APPLICATION OF COMMUNICATION

201. GENERAL

a. Communication is necessary for a tank unit commander to control his unit. For this reason, the

commander trains himself and his staff, as well as his unit commanders, to properly use the communication facilities available within the unit. All means of communication in the tank battalion are used. Too much reliance cannot be placed upon any one means. Although radio is the principal means of communication within the tank battalion, it is not considered for use to the exclusion of the other means.

b. The communication system during combat is planned to support the tactical plan. Since the tank battalion is flexible in its organization for combat, it needs a communication system that lends itself to flexibility and mobility. Voice radio sets with facilities for presetting channels, and with dual receivers, provide the flexibility. The radio sets mounted in vehicles provide the mobility. All assigned channels are preset—ready for immediate use. Each commander normally uses two channels. However, he must consider additional channels that he might have occasion to use—and have them preset ready for use.

202. RADIO NETS

The exact radio net to be used within the tank battalion depends upon its tactical make-up. However, certain basic nets are used as a guide, not only for uniformity, but also for planning purposes. These basic nets are the battalion command net, the headquarters net, the reconnaissance platoon net, and the command nets of the tank companies. Typical organization of these nets using two types of equipment is shown in figures 54 through 59.

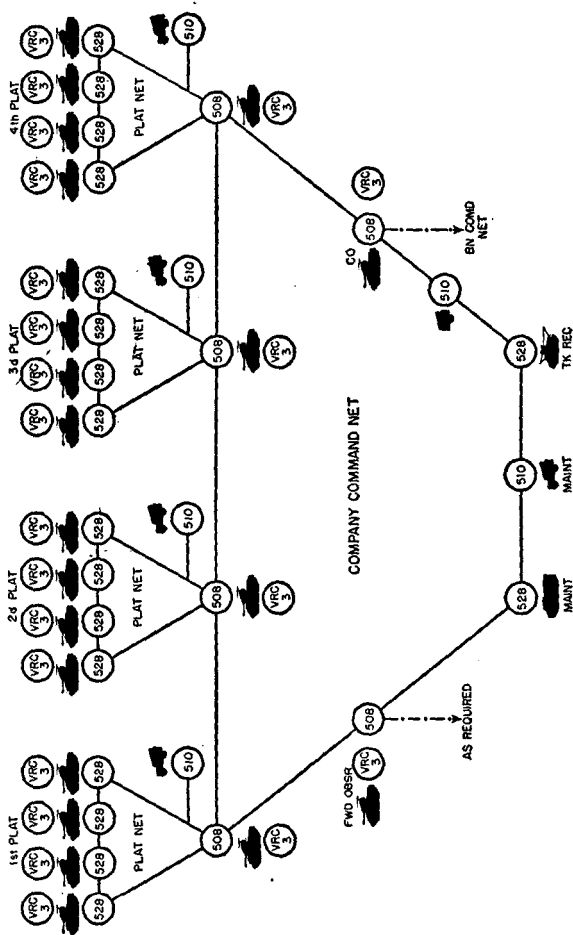


Figure 54. Type "A" radio nets for a tank company, tank battalion, with company and platoons on separate channels.

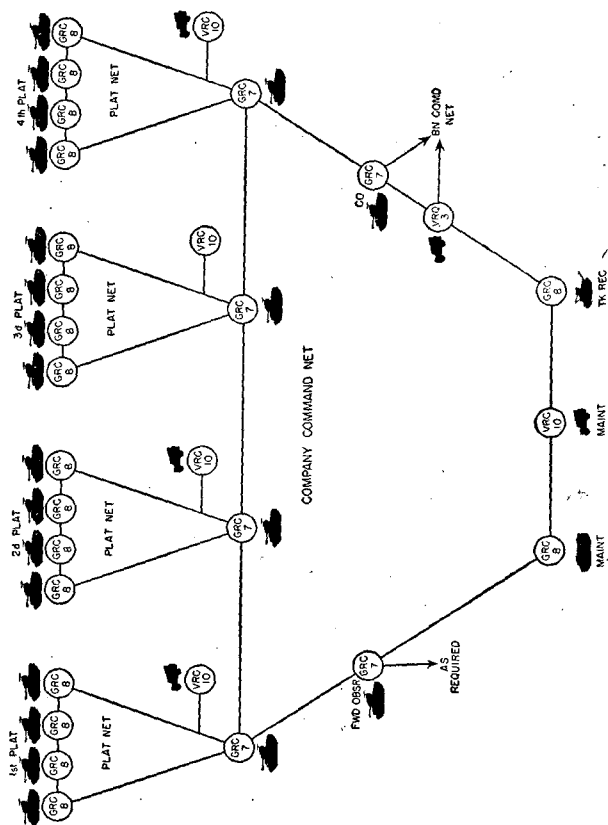


Figure 55. Type "B" radio nets for a tank company, tank battalion, with company and platoons on separate channels.

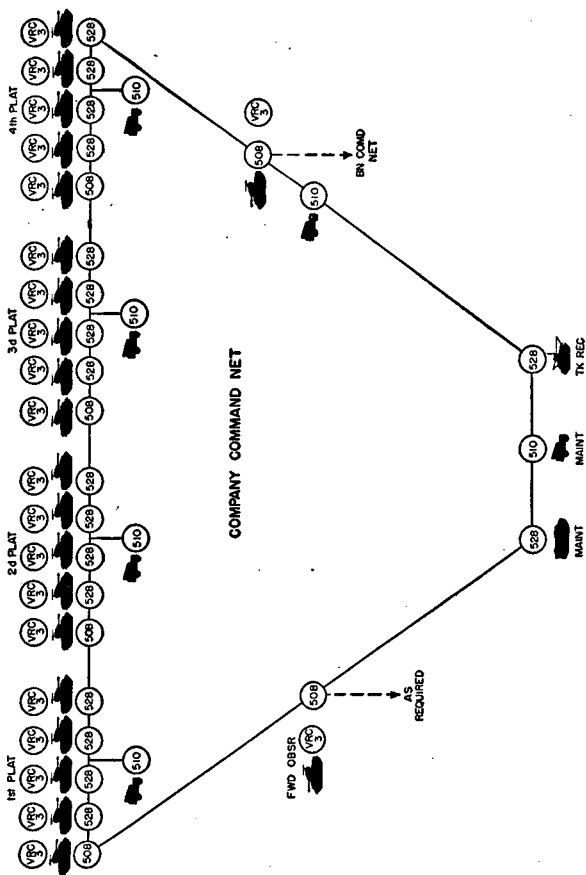


Figure 56. Type "A" radio nets for a tank company, tank battalion, with entire company on one channel.

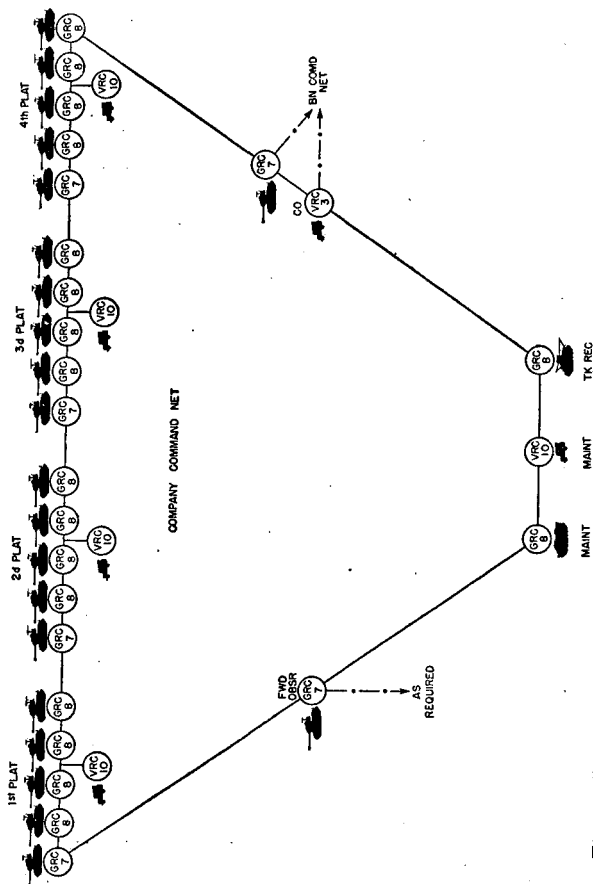


Figure 57. Type "B" radio nets for a tank company, tank battalion, with entire company on one channel.

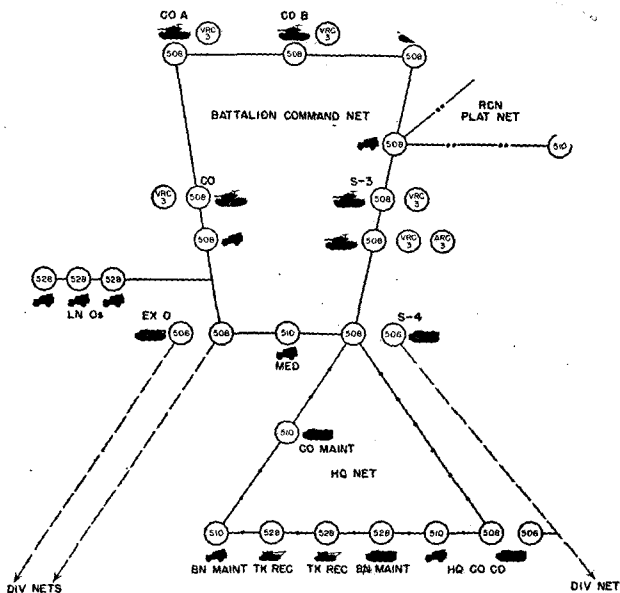


Figure 58. Type "A" radio nets for the tank battalion.

203. WIRE

Because of the rapidity of movement of the tank battalion in most operations, wire communication is used only to a limited extent. The amount of wire equipment within the battalion is limited, and no wire personnel are allotted in the tables of organization and equipment. Wire may be used during defensive operations, while the unit is in bivouac, while it is in an assembly area, or during radio silence. In a mobile defense, the communication system is similar to that employed in an attack. In

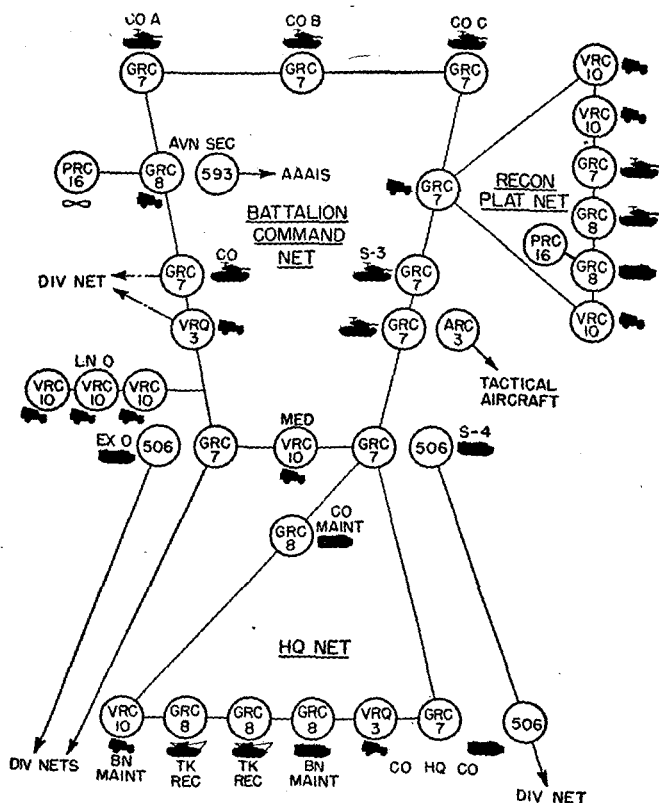


Figure 59. Type "B" radio nets for the tank battalion.

a sustained defense, the wire system is usually expanded. A typical wire system for the tank battalion is shown in figure 60.

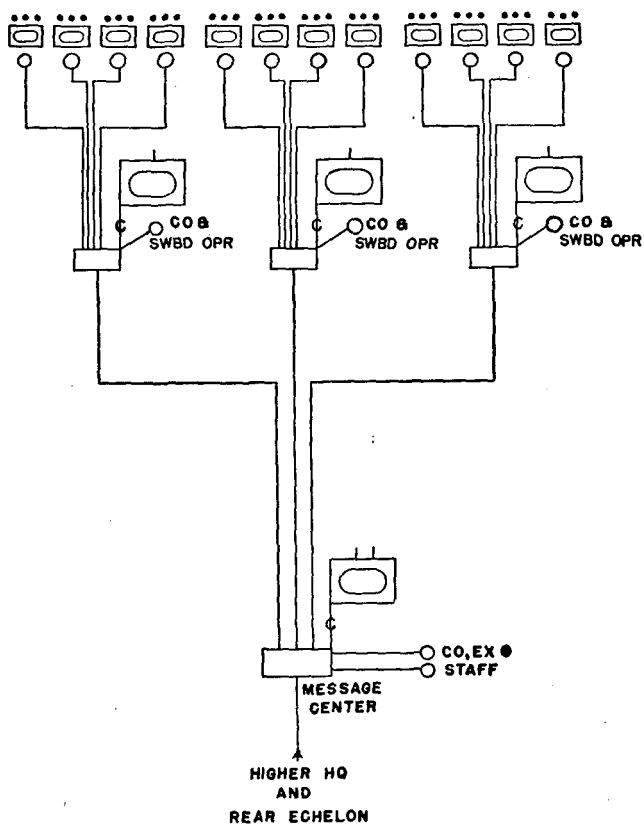


Figure 60. Type wire system for the tank battalion.

204. MESSENGERS

Motor messengers are included in the staff section of battalion headquarters, each of whom drives a vehicle. Authorized messengers are supplemented by designated personnel. Part of these messengers usually operate directly under the staff officers to whom they are assigned, while others operate as a part of the message center under the control of the message center chief. Designated foot messengers are used extensively for carrying local messages while the unit is in bivouac or in an assembly area. Light aircraft is available for messenger service.

205. VISUAL

Visual communication within the tank battalion consists of arm-and-hand signals, flags, panels, and pyrotechnics. Arm-and-hand signals and flag signals are used for control of movements, particularly while marching. Panels are used by all elements of the battalion for air-ground identification and recognition purposes. In the battalion headquarters, panels may be used for emergency ground-to-air communication with aircraft. Pyrotechnics, consisting of signal flares and colored smoke, are used for special operations and for emergency identification.

206. SOUND

Sound communication is used only as an emergency means and according to the battalion communications SOP.

CHAPTER 11

MEDICAL BATTALION

Section I. GENERAL

207. ORGANIZATION

a. The medical battalion is organized into a headquarters and headquarters company, an ambulance company, and a clearing company. The ambulance company consists of a company headquarters and three identical ambulance platoons. The clearing company consists of a company headquarters and three identical clearing platoons.

b. The operations and training officer (S-3) is also the communication officer. The operations sergeant in the headquarters and headquarters company is designated as the communication chief. He assists the communication officer (S-3) in supervising communication in the battalion. Radio operators, switchboard operators, and a lineman are authorized in the headquarters and headquarters company. Each platoon in the clearing company is authorized one radio operator. Additional personnel are designated and trained to assist assigned communication personnel and provide messenger service.

208. WIRE COMMUNICATION

a. Wire is the principal means of communication used in the medical battalion. The number of tele-

phones, local circuits, and trunk circuits included in the battalion wire system depends upon the equipment and time available, requirements of the situation, and capabilities of the communication personnel. The fundamental principle observed in determining the extent and complexity of the wire system is to install no more than is necessary for control.

b. Medical units are very limited in personnel and equipment for establishment, operation, and maintenance of wire systems. The available equipment in the battalion is distributed in accordance with the communication plan. A medical unit in need of wire communication enters the division wire system as provided in the communication plan. It may request assistance from the nearest unit in the establishment of such wire communications (par. 27).

209. RADIO COMMUNICATION

Long-range, amplitude-modulated radio sets are provided for the medical battalion. These sets are allocated to the headquarters and headquarters company and to the clearing company for use by the clearing platoons. They may be distributed to other units to support the communication plan. The available radio equipment lends itself to a flexible communication system which may easily be adapted to any situation. The unit SOP places limitations on the use of the radios to reserve them for essential traffic. Strict radio discipline is constantly enforced. All information pertaining to casualties, casualty figures, or percentages is highly classified. For further information on communication security, see paragraphs 33-36.

Section II. TACTICAL APPLICATION OF COMMUNICATION

210. GENERAL

The medical battalion provides division medical service to include—normal evacuation of regimental collecting stations and emergency evacuation of separate battalion aid stations, operation of the division clearing station, dental service, and medical supply service. This includes the timely evacuation of the collecting stations which requires speedy, reliable communication, capable of operating under all conditions of distance, weather, and terrain.

211. MEDICAL BATTALION

a. The medical battalion is provided with wire communication to division by the signal company. Wire communication is available to all units included in the division wire system (fig. 6.) Wire communication is established to the clearing company and the ambulance company.

b. The battalion may operate a radio in a division radio net (fig. 5). The clearing platoons operate radios in the battalion radio net (fig. 61).

c. Scheduled messenger service is established between the battalion, the ambulance company, and the clearing company. The battalion also uses ambulance drivers on their normal trips for messenger communication.

212. AMBULANCE COMPANY

The ambulance company command post normally is established near the battalion command post.

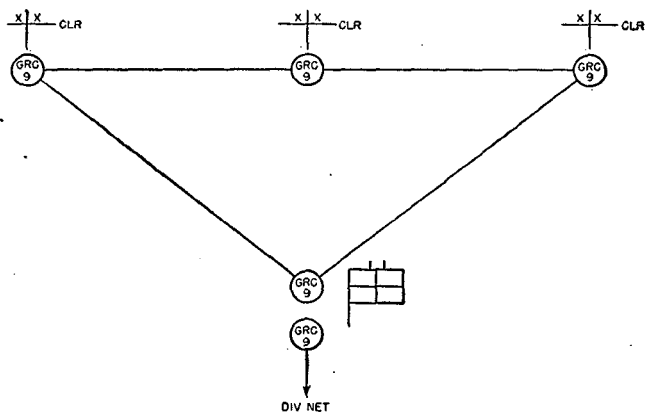


Figure 61. Type radio nets for the medical battalion when three separate clearing stations are operated.

In no case should it be farther away than the converging points of all ambulance routes controlled by the company. Communication to the battalion headquarters is by wire and messenger (ambulance drivers). Communication to the ambulance platoons is by messenger (ambulance drivers). The ambulance shuttle may be controlled at the clearing station and at the infantry regiment collecting stations. For operation of forward dispatch points on a long ambulance route, the battalion commander may attach radios to the ambulance company from the clearing company.

213. CLEARING COMPANY

a. There normally are three methods of employing the clearing company—by establishing one clearing station, utilizing all equipment and personnel; by

establishing one station with the equipment and personnel of one or two platoons and holding one platoon in reserve to move forward with the tactical advance; and by supporting each of the regimental combat teams with a clearing station, using one clearing platoon behind each regimental combat team.

b. The clearing company command post is established in the same general area as the battalion command post. Communication to battalion is by wire and messenger. When the clearing platoons are operating separate clearing stations, scheduled messenger service is provided between the company and platoons. Ambulance drivers operating on their normal routes and missions usually carry messages and information pertaining to the evacuation system between elements of the clearing and ambulance companies. They also transport medical supplies for the regimental collecting stations. Clearing platoons may operate radios in the battalion radio net when they are supporting regimental combat teams (fig. 61). Radio communication may be maintained between the battalion command post and collecting stations when collecting stations are being displaced along the route of movement.

CHAPTER 12

COMMUNICATION IN SPECIAL OPERATIONS

214. GENERAL

a. Communication is essential during all types of special operations. Applicable methods already discussed are used as a guide in its employment in a particular type of operation. Unusual conditions of terrain and weather impose additional problems in communication. Most of these problems can be overcome or reduced by prior planning and special training. Each operation requires an estimate of the communication situation based upon conditions to be encountered. Signal and communication officers employ their personnel and equipment in the most effective way to meet the needs of unit commanders and staffs. Plans for communication include procurement of additional personnel and equipment to supplement the personnel and equipment authorized by tables of organization and equipment, replacement of heavy and bulky equipment when the use of transportation during the impending operation will be denied or restricted, and immediate resupply of critical items that are adversely affected by the climatic and terrain conditions to be encountered.

b. A knowledge of conditions under which the unit will operate is necessary during the training period. Specialized training for the purpose of overcoming problems that might be encountered is conducted under simulated or actual conditions. If a specialized training program cannot be completed, emphasis is placed upon those training activities that minimize the problems to be encountered during the operation.

215. ATTACK OF A FORTIFIED POSITION

a. *General.* During the attack of a fortified position, all means of communication are used for the transmission of information and orders. More detailed coordination between the assaulting infantry and supporting units is required than in normal attack situations. To achieve this detailed planning for communication between infantry units and between infantry and supporting units is completed before the attack.

b. *Communication Facilities.* Permanent fortifications have dependable underground wire communication systems that reduce the defender's reliance on radio. This allows greater latitude in the jamming of the attacker's radio transmissions without adversely affecting the defensive communication system. When this type of interference is found, the attacker must depend more upon other means of communication. Radio nets providing common channels for communication between tank, infantry, and engineer units are established. During the initial phases of the attack, wire communication to include the assaulting rifle companies is desirable.

c. Communication for Fire Control. When guns or howitzers are used for direct-fire support of infantry units, all practical means of communication are used to insure that fire from these weapons can be lifted or shifted to other targets. It is sometimes necessary to shift fire back to a target from which it has been lifted. One reason for doing this is to regain momentum for an assault that has slowed and may fail without more fire support. Such emergencies require prearrangement of signals. The limited areas in which assault units, supporting units, and direct-fire weapons operate make the use of arm-and-hand signals, pyrotechnics, and smoke grenades practicable.

d. Engineer Communication. Engineers with the assault troops operate in squads, each squad having a detailed and specific mission to perform to assist the advance of foot troops and combat vehicles. Larger succeeding tasks are assigned to platoons and companies. Engineers use portable radios and sound-powered telephones. These are supplemented by messengers and by pyrotechnics and other visual signaling devices. Engineer command posts have wire and radio communication with engineers in the assaulting force, with reinforcing or supporting engineer elements, and with command and observation posts of the supported units. A prearranged pyrotechnic code may be used to indicate the progress of the attack, or to call for reinforcements. At gaps that have been made through obstacles, it often is necessary to establish communication to control traffic until all obstacles have been removed.

e. For further information on the attack of a fortified position, see FM 31-50.

216. OPERATIONS AT RIVER LINES

a. *General.* Communication during an attack to force a river crossing is similar to that required in other attacks. Command posts located close to the river avoid early displacement and facilitate control. Initially, wire and messengers are the principal means of communication. Other means are restricted until the attack has been discovered. A minimum wire system is installed for use during occupation of assembly areas and attack positions. The use of motor messengers in forward areas may be restricted for security reasons.

b. *During Crossing.* During the crossing, wire circuits are established across the river as soon as practicable. Each infantry battalion extends its own wire line. If this is impracticable, regiments establish a wire head across the river, and communication with battalions is established from this point. If the width of the river permits, wire is placed overhead. If this cannot be accomplished, weighted wire is laid in the water provided the current is not too swift. When neither of these methods is practicable, wire communication with troops on the far bank is installed upon completion of the engineer foot bridge.

c. *After Crossing.* After the crossing is completed and resistance is encountered, all means of communication are employed as in other attack situations. Assault boats may be used for messenger com-

munication to the opposite bank when bridges are not available.

d. Engineer Battalion Communication. In engineer units, communication facilities for the assembly area, attack positions, and engineer equipment park are installed immediately after receipt of orders for the crossing. For a typical wire system, see figure 52. Wire lines to assembly areas, traffic-control points, command posts, and river-crossing sites are buried when practicable to minimize destruction by enemy bombing and shelling. The engineer battalion command post is established before infantry troops move from assembly areas to attack positions. The battalion advance command post and the company command posts are established as early as possible. The time is dependent upon the tactical situation, security requirements, work requirements (approach roads and trails, boat arrangements, bridging dispositions), and engineer personnel and equipment available. Wire communication is established with the opening of the command posts. On the near river bank, radio communication for the engineer observation and liaison post is prepared before the arrival of the troops that are to make the crossing. As soon as the bridge is completed, control posts are established to provide traffic control on the bridge.

e. Supporting Engineer Communication. An engineer group supporting a division river-crossing operation is concerned with communication with its lower units, the group advance command post, the crossing site, and division units which it directly supports. Its wire and radio nets are similar to, and are normally coordinated and interconnected with, divi-

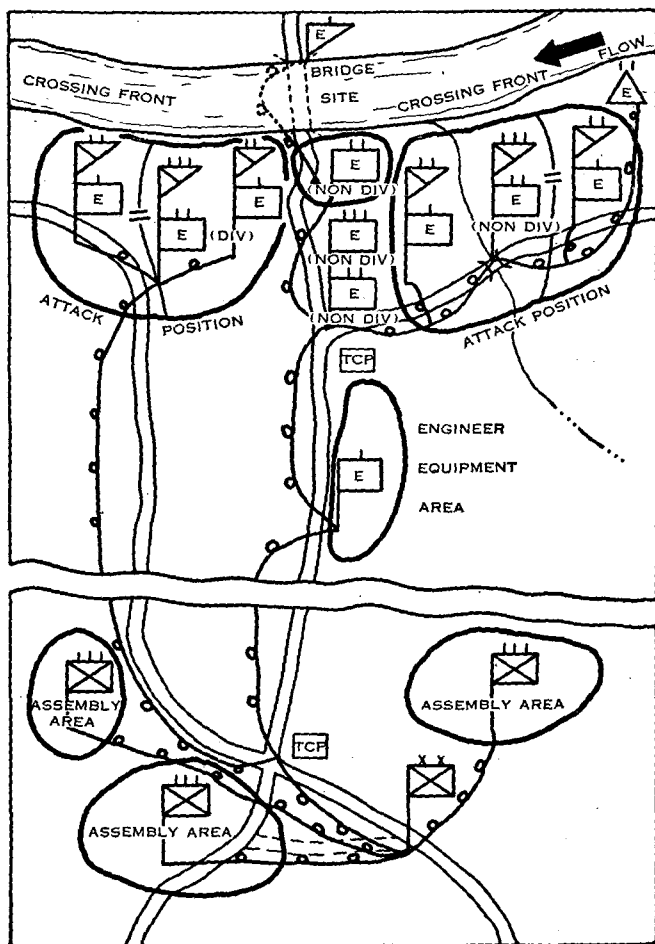


Figure 62. Type wire system for division river-crossing operation.

sion and engineer battalion nets through mutual agreement of the group commander, the division signal officer, and the division engineer.

f. During Defense of Crossing. Communication during defense of a river line is similar to that in other defensive operations. Wire communication is established to each outguard along the river bank and to the mobile reserve. Radio and visual means are restricted until the enemy attack begins.

g. For further information on operations at river lines, see FM 100-5 and FM 7-40.

217. NIGHT COMBAT

Night combat is characterized by difficulty in movement and maintenance of control and communication. Plans and reconnaissance for a night attack are more detailed than usual. Messengers, drivers, and field linemen are oriented as to routes and recognizable landmarks. Wire parties use wire dispensers to avoid making noise and to provide continuous communication during movement. Blackout facilities are provided for the operation of message centers, switchboards, and radios. Wire is used extensively during night defensive operations.

218. COMBAT IN TOWNS

a. Combat within towns is characterized by reduced effectiveness of fire and observation, by increased importance of close combat, and by difficulty in control of troops. Communication is adversely affected by restriction of visibility, limitations on

movement, and limitations on the effectiveness of radios when operated in or near buildings (particularly those reinforced with steel). It is facilitated by the shorter distances between headquarters. To minimize the effect of enemy artillery and small arms fire, command posts normally are located in basements or other covered structures. In some built up areas, the existence of covered routes such as subways, and traversable sewers aid in the establishment of communication. The installation of wire communication is slower than in open terrain because of the necessity of selecting suitable covered routes. It may often be practicable to use portions of existing commercial circuits in the installation of wire systems. Such use requires prior planning and a careful check of existing facilities. Further, it cannot be presumed that this will make the establishment of a wire system faster than installing wire lines.

b. For further information on combat in towns, see FM 100-5 and FM 31-50.

219. COMBAT IN WOODS

Combat in woods presents no outstanding problems in the installation, operation, and maintenance of communication systems in temperate climates. Dense woods that limit cross-country vehicular movement may require wire teams on foot to lay lines. Security is provided for wire teams when necessary. The operating ranges of radios are reduced in heavily wooded areas. The progress of messengers is slower than in open terrain. Visual

communication is difficult because of the limited visibility within woods.

220. MOUNTAIN OPERATIONS

a. General. During mountain operations, authorized equipment is supplemented by packboards, climbing equipment, and snow transport. It may be necessary to resort to the use of pack animals for the movement of equipment and supplies.

b. Wire. Communication is affected by the scarcity of commercial wire lines, by difficulties encountered in laying wire, by *dead spaces* in radio reception, and by terrain barriers between adjacent corridors in which troops are operating. Wire is the most dependable means of communication when it can be installed and maintained. Large numbers of telephones are required in defensive operations. It is desirable to have wire communication to small groups and individual gun emplacements. To protect wire lines from the movement of troops and pack animals, rock falls, landslides, avalanches, freshets, and deep snow, care in installation is necessary. Light aircraft may be used to lay wire over extremely difficult terrain.

c. Radio. Maintenance of radio communication in mountainous terrain is difficult because of mountain and tree masks, rough handling (often unavoidable), and adverse weather. The masking of signals may be overcome by carefully selecting operating locations for radios and using elevated antennas. Relay stations may be located on the tops of masking crests. Maximum use is made of light-

weight radios. Additional radios are desirable during mountain operations. Supply plans must be carefully made to insure that new batteries are continually available for all radios.

d. Supplementary Means of Communication. Messengers, messenger dogs, and visual signals are used to supplement wire and radio when these means become inadequate.

e. Command Post. The command post of a small unit usually is located near the observation post of the unit. Command posts of regiments and larger units should be near road centers and, if practicable, near landing fields.

f. For further information on mountain operations, see FM 100-5 and FM 70-10.

221. COMBAT IN SNOW AND EXTREME COLD

a. General. Combat in snow and extreme cold requires special communication considerations. The characteristics of such operations that affect communication are subzero temperatures, unrestricted but slow movement, and the use of small tactical forces. Most signal equipment can be used effectively under these conditions if the difficulties and necessary corrective measures are known. Difficulties accompanying overland movement and the effects of extreme cold on operating personnel and equipment are the principal limiting factors.

b. Communication Personnel. Communication personnel at message centers, switchboards, and radio stations are provided with suitable shelters. Other communication personnel are rotated frequently to

prevent overexposure to cold and undue fatigue. All personnel are provided with suitable cold weather clothing and are trained to care for themselves under cold weather conditions. They are also trained to use skis, snowshoes, and other oversnow movement devices.

c. Wire. Wire communication cannot be used to the same extent that it is in temperate climates because of logistical problems and the wide dispersal of units. When the tactical and logistical situations permit, wire is installed. When it can be installed and maintained wire is the most dependable means of communication in arctic regions. Track-laying vehicles with high flotation characteristics and cargo sleds are desirable for wire laying. Lightweight reels and wire dispensers may be mounted on small sleds or toboggans. The use of light aircraft expedites laying wire lines. Recovery of wire lines in snow by combat troops usually is impracticable. Extra wire is carried or resupplied by air. The maintenance of wire lines is difficult in snow and extreme cold. Care must be used in laying wire lines so they are afforded maximum protection from damage.

d. Radio. Radio communication in Arctic regions is affected by mountain masks, auroral disturbances, and extreme cold. Masking of radio signals may be overcome or reduced by exercising care in the selection of operating locations for radios and the use of elevated antennas. All radio operators should know special measures necessary for satisfactory radio operation in snow and extreme cold.

e. Messenger. Messenger service is provided by using skis, dog teams, oversnow vehicles, light aircraft, and helicopters. When suitable roads exist, wheeled vehicles may also be satisfactory for use.

f. Visual. Visual communication is particularly effective in air-ground operations, when atmospheric conditions or security requirements preclude the use of radio, and in mountainous country where the extreme ruggedness of the terrain prevents the laying of wire lines. Customary security considerations must be observed in using visual signals.

g. For further information on operations in snow and extreme cold, see FM 70-15 and TB SIG 219.

222. COMBAT AT DEFILES

Combat at defiles may require the convergence of wire lines. This increases the vulnerability of wire lines to enemy bombing or shelling. Mobile teams of communication personnel should be readily available to repair damaged wire lines. When the tactical situation permits, radio stations are located outside defiles to avoid the masking of signals by surrounding terrain.

223. JUNGLE OPERATIONS

a. Wire. During operations in the jungle, all means of communication are adversely affected. Dry batteries deteriorate more rapidly than normal, even when not in use. At least twice the normal supply for operations in temperate zones is required. Signal equipment must be dried out periodically. It is moistureproofed and fungiproofed before it

is taken into a jungle area. The decreased effectiveness of other means may necessitate laying additional wire circuits. The slow progress normally made in jungle fighting makes this possible. Wire lines laid along trails are subject to damage by foot and vehicular traffic. Frequent rains and constant dampness reduce the effective range of communication over field wire circuits. This range may be increased by installing two separate twisted-pair wire lines as conductors for one circuit and by the use of repeaters and amplifying telephones. To maintain satisfactory wire communication over long lines, it may be necessary to have wire maintenance teams located at intervals along such lines. Supply and transportation problems usually necessitate the use of lightweight wire and switchboards. Security is provided for wire teams when necessary. Light aircraft may be used to lay wire.

b. Radio. The operating ranges of radio sets are greatly reduced during jungle operations. Jungle vegetation absorbs much of the energy radiated by a radio antenna located beneath it. Operating personnel require additional practice during training in getting traffic through with weak signals under poor atmospheric conditions. Radiotelegraph signals are more effective than voice signals at extreme ranges. The value derived from using portable radios is limited by the reduction in their operating ranges. Special emphasis is placed upon teaching operating personnel where to establish their sets for maximum operating efficiency and how to use elevated antennas in overcoming the damping effect of jungle vegetation and terrain.

c. Messenger. Foot messengers are used extensively in jungle operations. They are frequently dispatched in pairs to provide mutual protection against ambush. Pigeons and messenger dogs may be used effectively. Light aircraft may be used to carry messages.

d. Visual. Colored smoke streamers may be used effectively to mark positions for friendly aircraft. Smoke from grenades may not rise above the jungle growth. Other visual signals are of relatively little value due to the limited visibility.

e. Supply. Transportation of equipment and supplies is usually difficult because of limited road nets. Where vehicles cannot operate, additional personnel may be required to assist in transporting signal equipment and supplies. Others may be necessary to assist in the installation, operation, and maintenance of communication systems.

f. For further information on jungle operations, see FM 72-20.

224. DESERT OPERATIONS

Desert operations are characterized by speed and mobility. Movement usually is cross-country. Lines of communication are likely to be long and subject to frequent interruption by enemy air and ground attacks. Long advances and retrograde movements may take place. Maximum use is made of radio. Radio communication is maintained with supply echelons. Wire communication is used, but the premature establishment of wire systems avoided. Wire is used in defensive situations. Since wire

lines are laid on the ground, they are frequently damaged by vehicular traffic. Motor messengers are used extensively. Visual and sound signals are very effective in desert operations, but security requirements may preclude their use. Adequate measures are taken to conceal installations, such as command posts from enemy ground and aerial observation. Wide dispersion of installations is necessary. Extreme conditions of temperature and dust make cleaning and maintenance of signal equipment especially important. For further information on desert operations, see FM 31-25.

225. AMPHIBIOUS OPERATIONS

a. Planning. Planning communication for an amphibious operation begins with the first knowledge of the impending operation and continues until the operation has been completed. Signal and communication officers are given as much information of the operation as security permits, upon which they base their plans for communication.

b. Training Requirements. Concentration and specialized training precedes embarkation. During this phase, all troops to participate in the landing are assembled. Communication personnel are trained with other personnel in the use of cargo nets, small landing craft, and in waterproofing equipment. Specialized communication training includes communication exercises aboard landing craft and command ships. If possible, a rehearsal is conducted in which the entire landing force embarks upon a training operation and lands on a beach similar

to the actual objective. It is particularly desirable that artillery forward-observer sections be given training in radio net operation with fire-support ships during the training and rehearsal phases.

c. During Embarkation. During embarkation, troop message centers are established on board each ship before the arrival of the troops. These message centers facilitate the transmission of messages between the commander of troops, unit commanders, and the ship's communication office. Signal equipment is loaded so as to facilitate unloading. Some items of signal equipment are hand-carried by operating personnel.

d. During the Voyage. During the voyage, naval personnel provide communication between the ships in the convoy. Blinker lights and flags are the principal means used. Radio silence usually is prescribed until the landing starts. Details of the operation and final instructions pertaining to assault communication systems are given to communication personnel during the voyage.

e. After Landing. After landing, communication systems are similar to those used in the attack. Radio is the principal means of communication until wire systems are installed. Care must be taken in laying wire lines to prevent their being damaged by movement of troops and vehicles. This is especially important in the beachhead area. Messengers are used extensively by all units. Visual signals, particularly pyrotechnics, are used by leading assault elements to indicate when phase lines and objectives are reached. Marking panels are used to identify

units and to mark front-line positions for friendly aircraft. Sound signals may be used.

f. Fire Control. During the period between the landing of the first wave of infantry and the landing of the artillery, supporting fires are furnished by naval vessels, especially equipped support craft, and tactical aircraft. Naval gunfire is normally conducted by naval gunfire teams that go ashore with the assault elements. These teams are supplemented by artillery forward observers who are also trained to adjust naval gunfire. Artillery forward observers may take over adjustments of supporting naval fires completely. They are given technical assistance by naval gunfire liaison officers assigned to artillery battalions for this purpose. Radio is used for communication between artillery forward observers, naval gunfire teams, naval gunfire liaison officers, and fire-support ships. Additional radios that may be required for this purpose are procured before embarkation. Radio communication to the command ship is supplemented by dispatch boat. All artillery and naval fires and air support missions are coordinated. Air support is directed by air force tactical air control parties.

g. Field Artillery. Direct-support field artillery normally is landed on call. Centralized fire direction within an artillery battalion is established as soon as practicable. This may be considerably after the landing of the initial waves. The leading echelon of a direct-support artillery battalion headquarters lands at the same time as the advance echelon of the infantry regimental command group. It initiates prompt reconnaissance, establishes the bat-

talion command post, and installs communication facilities. As soon as communication is established, firing batteries are brought under centralized command.

h. During the consolidation phase, faulty or damaged equipment is repaired or replaced, casualties are replaced, and wire lines are shortened and serviced. For further information on amphibious operations, see FM 31-5 and FM 60-5.

APPENDIX I

REFERENCES

1. MILITARY TERMS

SR 320-5-1 Dictionary of the United States
 Army Terms.
Dictionary of United States Military Terms for
 Joint Usage.

2. LIST OF TRAINING PUBLICATIONS

See the SR 310-20 series.

3. TRAINING FILMS, FILM STRIPS, AND FILM BULLETINS

SR 110-1-1 Index of Army Motion Pictures
 and Film Strips.

4. TRAINING AIDS

FM 21-8 Military Training Aids.

5. OTHER FIELD MANUALS, TECHNICAL MANUALS, AND FIELD SERVICE REGULATIONS

FM 5-5 Engineer Troops.
FM 5-6 Operations of Engineer Units.
FM 6-20 Field Artillery Tactics and Tech-
 nique.

FM 7-10	Rifle Company, Infantry Regiment.
FM 7-15	Heavy Weapons Company, Infantry Regiment.
FM 7-20	Infantry Battalion.
FM 7-25	Headquarters Company, Infantry Regiment.
FM 7-30	Service and Medical Companies, Infantry Regiment.
FM 7-35	Tank Company, Infantry Regiment.
FM 7-37	Heavy Mortar Company, Infantry Regiment.
FM 7-40	Infantry Regiment.
FM 11-80	Signal Pigeon Company.
FM 17-22	Reconnaissance Platoon and Reconnaissance Company.
FM 17-32	Tank Company and Tank Platoon.
FM 17-33	Tank Battalion.
FM 17-70	Signal Communication in the Armored Division.
FM 20-100	Army Ground Forces Light Aviation.
FM 21-25	Elementary Map and Aerial Photograph Reading.
FM 21-26	Advanced Map and Aerial Photograph Reading.
FM 21-30	Conventional Signs, Military Symbols, and Abbreviations.
FM 21-75	Infantry, Scouting, Patrolling, and Sniping.
FM 24-16	Signal Orders, Records, and Reports.

FM 24-17	Signal Center, and Message Center Procedure.
FM 24-18	Radio Communication.
FM 24-20	Field Wire Technique.
FM 31-5	Landing Operations on Hostile Shores.
FM 31-25	Desert Operations.
FM 31-35	Air-Ground Operations.
FM 31-50	Attack on a Fortified Position and Combat in Towns.
FM 44-2	Employment of Antiaircraft Artillery, Automatic Weapons.
FM 44-51	Fire Control, Antiaircraft Artillery, Automatic Weapons.
FM 70-10	Mountain Operations.
FM 70-15	Operation in Extreme Cold.
FM 71-30	Airborne Operations.
FM 72-20	Jungle Warfare.
FM 100-5	Operations.
FM 100-11	Signal Communications Doctrine.
FM 100-15	Larger Units.
FM 101-5	Staff and Combat Orders.
	Appropriate Joint Army-Navy-Air Force Publications (See JANAP 199 (B) for index).
	Appropriate Technical Manuals of the 11-Series:
TM 11-450	Training of Signal Communication Personnel.
TM 11-488	Remote Control Equipment for Ground Radio Sets and Interconnection with Wire Systems.

- TM 12-406 Officer Classification — Commissioned and Warrant.
- TM 12-427 Military Occupational Classification of Enlisted Personnel.
- TB SIG 219 Operation of Signal Equipment at Low Temperatures.
- JANAP 122 Security.
- JANAP 124 Radio Telegraph Procedure.

APPENDIX II

CHARACTERISTICS OF RADIO SETS IN THE INFANTRY AND AIRBORNE INFANTRY DIVISIONS

Type	Range	Signal	Channels	Type or operation	Frequency
AN/ARC-3.....	{Plane at 1,000 ft: 30 mi. Plane at 10,000 ft: 135 mi.	{Voice; A.M.	{310..... 8 preset.....	{Air force set..... Airborne or vehicular.	{100-156 mc.
AN/TRC-3.....	Average—25 mi.....	Voice; F.M.	{301..... 1 preset.....	{Transportable (ap- prox. 3,000 lb).	{70-100 mc.
AN/GRC-9.....	{S: 30 mi CW M: 20 mi CW S: 15 mi voice M: 10 mi voice	CW; MCW; voice; A.M.	6 crystals and con- tinuous tuning.	{Transportable (3- manload) or vehic- ular.	{2-12 mc.
AN/VRC-3.....	3 mi.....	Voice; F.M.	{41..... Continuous tuning..	{Vehicular.....	{40-48 mc.
AN/VRC-5.....	10 to 15 mi.....	Voice; F.M.	{80..... 10 preset.....	{Vehicular.....	{20-27.9 mc.
SCR-193.....	{S: 60 mi CW M: 30 mi CW S: 40 mi MCW M: 20 mi MCW S: 20 mi voice M: 15 mi voice	{CW; MCW; voice; A.M.	Continuous tuning..	Vehicular.....	{Xmitr: 1.5-6.2 mc. Revtr: 1.5-18 mc.
SCR-300.....	3 mi.....	Voice; F.M.	{41..... Continuous tuning..	{Portable; 38 lb (w/ BA-70), 32 lb (w/ BA-80).	{40-48 mc.

SCR-399	{250 mi CW 100 mi voice	CW; voice; AM	{3 crystals and con- tinuous tuning (2 revr)	{Mobile	{Xmtr: 2-18 mc. Rvr: 1.5-18 mc.
SCR-506	{S: 75 mi CW M: 35 mi CW S: 25 mi voice M: 15 mi voice	CW; voice; AM	4 preset and con- tinuous tuning	{Vehicular	{Xmtr: 2-4.5 mc. Rvr: 2-6 mc.
SCR-508	10 to 15 mi	Voice; FM	{80; 2 revrs 10 preset	{Vehicular	20-27.9 mc.
SCR-510	5 mi	Voice; FM	{80 2 preset	{Portable; (approx. 63 lb) or vehicular.	{20-27.9 mc.
SCR-528	10 to 15 mi	Voice; FM	{80 10 preset	{Vehicular	20-27.9 mc.
SCR-536	1 mi	Voice; FM	{50 1 preset	{Portable (hand or shoulder; 5.5 lb).	{3.5-6 mc.
SCR-543	{S: 50 mi CW M: 25 mi CW S: 30 mi voice M: 15 mi voice	Voice; CW; AM	{6 preset	{Transportable (ap- prox 966 lb) or vehicular.	{1.68-4.45 mc.
SCR-593		{Rvr only voice; AM	{4 preset	{Portable (approx 24 lb) or vehicular.	{2-6 mc.
SCR-608	10 to 15 mi	Voice; FM	{120; 2 revrs 10 preset	{Vehicular	27-38.9 mc.
SCR-619	5 mi	Voice; FM	{120 2 preset	{Portable (approx 54 lb) or vehicular.	{27-38.9 mc.
SCR-628	10 to 15 mi	Voice; FM	{120 10 preset	{Vehicular	27-38.9 mc.

S—Stationary, M—Moving, Xmtr—Transmitter, Rvr—Receiver

CHARACTERISTICS OF RADIO SETS

Type	Range	Signal	Channels	Type or operation	Frequency
AN/GRC-5...	{A-Set S: 15 mi M: 10 mi. B-Set 1 mi.	{FM. Voice.	{A-Set 120. B-Set 115.	{Ground and vehicu- lar.	{A-Set 27-38.9 mc. B-Set 47-58.4 mc.
AN/GRC-6...	{A-Set S: 15 mi M: 10 mi. B-Set 1 mi.	{FM. Voice.	{A-Set 120. B-Set 115.	{Ground and vehicu- lar.	{A-Set 27-38.9 mc. B-Set 47-58.4 mc.
AN/GRC-7...	{A-Set S: 15 mi M: 10 mi. B-Set 1 mi.	{FM. Voice.	{A-Set 170. B-Set 115.	{Ground and vehicu- lar.	{A-Set 38-54.9 mc. B-Set 47-58.4 mc.
AN/GRC-8...	{A-Set S: 15 mi M: 10 mi. B-Set 1 mi.	{FM. Voice.	{A-Set 170. B-Set 115.	{Ground and vehicu- lar.	{A-Set 38-54.9 mc. B-Set 47-58.4 mc.
AN/VRQ-2...	S: 15 mi M: 10 mi.	{FM. Voice.	{120. 170.	{Vehicular. Vehicular.	{27-38.9 mc. 38-54.9 mc.
AN/VRQ-3...	S: 15 mi M: 10 mi.	{FM. Voice.	{170. 115.	{Vehicular. Vehicular.	{38-54.9 mc. 47.0-58.4 mc.
AN/VRC-7...	1 mi.	{FM. Voice.	{115. 120.	{Vehicular. Vehicular.	{47.0-58.4 mc. 27-38.9 mc.
AN/VRC-9...	S: 15 mi M: 10 mi.	{FM. Voice.	{120. 170.	{Vehicular. Vehicular.	{27-38.9 mc. 38-54.9 mc.
AN/VRC-10...	S: 15 mi M: 10 mi.	{FM. Voice.	{170. 43.	{Vehicular. Portable.	{38-54.9 mc. 47-55.4 mc. (Not 1.)
AN/PRC-6...	1.5 mi.	{FM. Voice.	{43.	{Portable.	{47-55.4 mc. (Not 1.)

AN/PRC-9....	3-5 mi.....	{ FM Voice.....	{ 120.....	Portable.....	27-38.9 mc.
AN/PRC-10....	3-5 mi.....	{ FM Voice.....	{ 170.....	Portable.....	38-54.9 mc. 2.)
AN/PRC-16....	1 mi.....	{ FM Voice.....	{ 115.....	Portable.....	47-58.4 mc.

Note 1. Replaces SCR 536 when available.

Note 2. Replaces SCR 300 when available.

INDEX

	<i>Paragraph</i>	<i>Page</i>
AAA-infantry communication (infantry regiment)-----	154	190
Adjutant (G-1 or S-1)-----	6a	4
Airborne infantry regiment-----	156-161	192
Amphibious operations, communication during-----	225	262
Antiaircraft artillery automatic weapons battalion-----	99	104
Approach march, communication during (infantry regiment)-----	132	149
Armored units, communication in support of-----	121-123	140
Army aviation-----	99	104
Artillery, airborne division-----	119, 120	130, 132
Artillery-infantry communication (infantry regiment)-----	153	188
Assembly aids-----	90	97
Assembly areas, communication in (infantry regiment)-----	133	150
Attack, communication during:		
Division artillery-----	108-111	124
Engineer (C) battalion, infantry division-----	172	212
Infantry regiment-----	134-140	151
Signal company-----	64-68	72
Attack of a fortified position-----	215	249
Axes of signal communication-----	25, 200	22, 233
Center, communication:		
General-----	11	9
Signal company-----	49b, 54b, 59b, 63b, 67b, 78b	52, 58, 65, 69, 74, 84
Clearing company, medical battalion. (See Medical battalion).		

	<i>Paragraph</i>	<i>Page</i>
Combat at defiles.....	222	259
Combat in:		
Snow and extreme cold.....	221	257
Towns.....	218	254
Woods.....	219	255
Command post:		
Division artillery.....	101, 109, 110	108, 124, 125
General.....	18-25	15
Infantry regiment.....	127, 130 <i>f</i> , 139, 140	144, 148, 170, 172
Signal company.....	62, 66, 70, 77	68, 74, 78, 82
Tank battalion.....	197-200	228
Command post group.....	40 <i>b</i> (1)	42
Communication:		
Airborne operations, defense against (infantry regiment)....	148	181
During airborne operations, as- sault phase.....	161	199
In support company, airborne infantry regiment.....	158	195
Means.....	26-32	22
Personnel.....	2	1
Planning for airborne operation..	157	192
Requirements, division artillery..	100	107
Responsibility.....	5	3
Security.....	33-36	34
Special operations.....	214-225	248
Staff coordination.....	6	4
Training.....	37-39	38
Wire.....	102	108
With supporting engineer group for engineer (C) battalion.....	167	209
Communication officer, duties:		
Airborne infantry regiment.....	159-161 <i>c</i>	198
Division artillery.....	99 <i>f</i> , 112 <i>c</i> , 117	106, 126, 129
General.....	8	7

Communication officer—Continued	Paragraph	Page
Infantry regiment.....	126, 134, 143b	143, 151, 176
Medical battalion.....	207b	243
Tank battalion.....	191b	226
Communication platoon leader, duties:		
Airborne infantry regiment.....	161c	200
General.....	9, 126	8, 143
Communications intelligence.....	35, 48f	36, 51
Concentration, communication during:		
Division artillery.....	104, 105	122
Engineer (C) battalion, infantry division.....	169	210
Infantry regiment.....	128, 129	145
Signal company.....	46-49	49
Construction platoon.....	44	45
Cryptographic security.....	35	36
Defense, communication during the:		
Division artillery.....	114, 115	128
Engineer (C) battalion, infantry division.....	175	213
Infantry regiment.....	143-149	175
Signal company.....	76-80	82
Defiles, combat at.....	222	259
Delaying action, communication during:		
Engineer (C) battalion, infantry division.....	177	214
Infantry regiment.....	151	186
Signal company.....	82	91
Desert operations.....	224	261
Development, communication during the:		
Engineer (C) battalion, infantry division.....	171	211
Signal company.....	61-63	68
Division artillery.....	99-123	104
Airborne division.....	119, 120	130, 132
Armored units.....	121	140
Command posts.....	101	108

Division artillery—Continued	Paragraph	Page
Communication requirements and principles.....	100	107
Field artillery battalions.....	99	104
Organization.....	99	104
Radio communication.....	103	115
Tactical application of communication.....	105-118	122
Wire communication.....	102	108
Division signal officer section.....	41	43
Division signal supply, photographic and maintenance section.....	42	44
Duties—		
Communication officer, general..	8	7
Communication platoon leader, general.....	9	8
Message center personnel, general.....	12b	10
Signal officer:		
General.....	7	6
Infantry division.....	65, 78a, 81 (2)	72, 83, 88
Engineer battalion, airborne division..	178-180	215
Engineer combat battalion, infantry division.....	162-177	204
Engineer-infantry communication infantry regiment.....	155	191
Equipment:		
Airborne infantry regiment.....	161a	199
General.....	4	2
Maintenance and repair.....	13	11
Tank battalion.....	192b	227
Field artillery battalion.....	99	104
Firing battery.....	99	104
Fortified position, attack.....	215	249
Halts. (See Marches and halts.)		
Headquarters commandant.....	6e	6
Infantry:		
Division signal company.....	40-82	40

Infantry—Continued	<i>Paragraph</i>	<i>Page</i>
Regiment.....	124-155	142
Infantry-antiaircraft artillery communication.....	154	190
Infantry-artillery communication.....	153	188
Infantry-engineer communication.....	155	191
Infantry-tank communication.....	152	187
Intelligence officer (G-2 or S-2).....	6b	4
Integration of wire and radio systems.....	32	34
Jungle operations.....	223	259
Maintenance and repair:		
General.....	13	11
Motor maintenance.....	43b	45
Signal company, infantry division.....	42c	44
Marches and halts, communication during:		
Artillery, infantry division.....	106, 107	123, 124
Engineer (C) battalion, infantry division.....	170	210
Infantry regiment, infantry division.....	130, 131	146, 148
Signal company, infantry division.....	50-60	54
Marshalling, communication during..	86, 160	95, 199
Means of communication.....	26-31	22
Medical battalion:		
Communication officer.....	207b	243
Organization.....	207a	243
Radio communication.....	209	244
Tactical application of communication.....	210-213	245
Wire communication.....	208	243
Message center:		
Artillery, infantry division.....	106b	123
General.....	12	9
Signal company, infantry division..	45a, 74a	47, 80

	<i>Paragraph</i>	<i>Page</i>
Message procedure, infantry regiment.....	127	144
Messenger communication:		
Artillery, airborne division.....	120b	134
Engineer (C) battalion, infantry division.....	166a	209
General.....	29	30
Infantry regiment:		
Airborne division.....	158d	198
Infantry division.....	127a, 130c, 137	144, 147, 170
Reconnaissance company.....	184	222
Signal company.....	49c, 54c, 59c, 63c, 67c, 74b, 78c, 78d	53, 58, 66, 70, 75, 80, 84, 85
Tank battalion.....	194, 204	228, 242
Mountain operations.....	220	256
Night combat.....	217	254
Operations platoon, signal company, infantry division.....	45	46
Operations and training officer (G-3 or S-3).....	6c	5
Orders:		
For the attack, infantry regiment.....	134	151
Oral, communication officer.....	17	14
Paragraph 5, operation order.....	7f, 16	6, 12
SOI.....	14	11
SOP.....	15, 184	12, 222
SSI.....	14	11
Organization:		
Airborne infantry regiment.....	156	192
Artillery:		
Airborne division.....	119a	130
Infantry division.....	99a	104
Engineer (C) battalion:		
Airborne division.....	178	215
Infantry division.....	162	204

Organization—Continued	Paragraph	Page
Infantry regiment, infantry division.....	124	142
Medical battalion.....	207a	243
Reconnaissance company.....	181a	218
Signal company:		
Airborne division.....	83	92
Infantry division.....	40-45	40
Tank battalion.....	191a	226
Organization of teams:		
General.....	3	2
Command post.....	40b (1), (2)	42, 43
Division signal company.....	40b	40
Pathfinders.....	89	97
Personnel:		
Communication.....	2	1
Teams.....	3	2
Airborne infantry communication..	161b	200
Photographic activities, division signal..	42b	44
Physical security of classified material..	34	35
Pursuit, communication during:		
Division artillery.....	108, 113	124, 127
Engineer (C) battalion, infantry division.....	174	213
Infantry regiment.....	142	175
Signal company, infantry division..	73-75	79
Radio communication:		
Airborne division artillery.....	120	132
Characteristics of radio sets.....	App. II	270
Division artillery.....	103, 105c	115, 122,
	106d, 118c,	123, 130,
	122	140
Engineer combat battalion, infantry division.....	165	206
Infantry regiment.....	130b, 136,	146, 159,
	145	179
Integration of wire and radio systems.....	32	34
Medical battalion.....	209	244

Radio communication—Continued	Paragraph	Page
Reconnaissance company-----	183	220
Signal company, infantry division-----	45 <i>b</i> , 45 <i>d</i> , 49 <i>d</i> , 54 <i>d</i> , 63 <i>d</i> , 67 <i>d</i> , 74 <i>c</i> , 78 <i>d</i>	47, 48, 53, 59, 70, 75, 80, 85
Support company, airborne division-----	158 <i>c</i>	196
Tank battalion-----	192, 202	226, 234
Radio section, signal company-----	45 <i>b</i>	47
Reconnaissance company-----	181-190	218
Relief, communication during (infantry regiment)-----	149	182
References—Appendix I (characteristics of radio sets)-----	App. I	266
Reorganization, communication during:		
Airborne division-----	161 <i>d</i> , 161 <i>e</i>	201
Division artillery-----	108, 112	124, 126
Engineer battalion-----	173	212
Infantry regiment-----	141	174
Signal company-----	69-72	77
Responsibilities. (See Duties.)		
Responsibilities:		
Commanding officer-----	5, 33 <i>b</i>	3, 35
Communication:		
Officer-----	8, 112 <i>c</i> , 117, 126, 140 <i>a</i> , 143 <i>b</i> , 207 <i>b</i> , 161 <i>c</i> , 162, 191 <i>b</i>	7, 126, 129, 143, 172, 176, 243, 200, 204, 226
Platoon leader-----	9, 126	8, 143
Division signal officer-----	7, 65, 78 <i>a</i> , 81 <i>a-c</i>	6, 72, 83, 88
Retrograde movement, communication during:		
Engineer combat battalion, infantry division-----	177	214
Division artillery-----	116-118	129

Retrograde movement—Continued	Paragraph	Page
Infantry regiment.....	150, 151	183, 186
Signal company.....	81, 82	88, 91
River line, operation.....	216	251
Rules of responsibility.....	5	3
Security:		
Command post.....	23	21
Cryptographic.....	35	36
During marches and halts.....	55	63
General, communication.....	33	34
Physical.....	34	35
Transmission.....	36	37
Selecting command posts.....	6-8, 16, 19	4, 12, 16
Shuttling.....	52	56
Signal company, airborne-infantry division.....	83-98	92
After consolidation.....	94	101
Air movement.....	87	96
Assault, communication during.....	88-94	96
Assembly aids.....	90	97
Communication:		
Base camps.....	96	102
Channels established.....	91	98
Marshalling.....	86	95
Organization.....	83	92
Pathfinders.....	89	97
Phases of operations.....	84	92
Planning for an operation.....	85	93
Supply.....	97, 98	102, 103
Wire communication.....	93	101
Signal company, infantry division.....	40-82	40
Company headquarters.....	43	45
Construction platoon.....	44	45
Division signal officers' section.....	41	43
Operations platoon.....	45	46
Organization.....	40-45	40
Supply, photo, and maintenance section.....	42	44
Tactical application of communi- cation.....	46-82	49

Signal:	Paragraph	Page
Intelligence.....	6b	4
Officer:		
Duties.....	7	6
Section, DSO.....	41	43
Operation instructions.....	14, 125	11, 143
Orders.....	7f, 14-17	6, 11
Repair.....	13, 42	11, 44
Supply:		
Airborne operations.....	92,	100, 102,
	97, 98, 161a	103, 199
General.....	4	2
In tactical situations.....	48, 60, 68,	51, 68, 77,
	72, 75, 79	79, 81, 86
S-4 or G-4 responsibility.....	6d	5
Supply group, division signal company.....	42a	44
Snow and extreme cold, combat.....	221	257
Sound communication. (See Visual and sound communication.)		
Special operations.....	214-225	248
Staff coordination, communication....	6	4
Standing operating procedure:		
General.....	15	12
Reconnaissance company.....	186	223
Staff responsibility.....	6	4
Standing signal instructions.....	14	11
Support company, airborne-infantry regiment.....	158	195
Tactical application of communica- tion:		
Airborne infantry regiment.....	159-161	198
Artillery:		
Airborne-infantry division....	119-121	130
Infantry division.....	104-118	122
Engineer batallion, airborne div- ision.....	180	216
Engineer (C) batallion, infantry division.....	168-177	210
Infantry regiment.....	128-155	145

Tactical application of communica-		
tions—Continued	Paragraph	Page
Medical battalion.....	210-213	245
Reconnaissance company.....	187-190	223
Signal company:		
Airborne-infantry division....	85-96	93
Infantry division.....	46-82	49
Special operations.....	214-225	248
Tank battalion.....	191-206	226
Command posts.....	197-200	228
Communication officer.....	191 <i>b</i>	226
Messenger communication.....	194	228
Organization.....	191	226
Radio communication.....	192	226
Tactical application of communi-		
cation.....	201-206	233
Wire communication.....	193	227
Tank-infantry communication.....	150	183
Telephone and teletype section.....	45 <i>c</i>	48
Towns, combat.....	218	254
Traffic priority.....	10	9
Training.....	37-39	38
Transmission security.....	36	37
Transportation.....	4	2
Visual and sound communication:		
Engineer (C) battalion, infantry		
division.....	166 <i>b, c</i>	209
General.....	30, 31	32, 33
Heavy tank battalion.....	195, 196,	228, 242
	205, 206	
Infantry regiment.....	130 <i>d</i> , 138,	147, 170,
	147	181
Reconnaissance company.....	185	223
Wire communication:		
Airborne division.....	93	101
Artillery:		
Airborne division.....	120 <i>b</i>	134
Infantry division.....	102, 114,	108, 128,
	118 <i>b</i> , 123	130, 140

Wire communication—Continued	Paragraph	Page
Construction platoon, infantry division signal company-----	44	45
Engineer (C) battalion, infantry division-----	164	205
General-----	27	23
Heavy tank battalion-----	193, 203	227, 239
Infantry:		
Division-----	49e, 54f, 59f, 63f, 67f, 78f	54, 62, 67, 71, 76, 85
Regiment-----	130, 135, 144	146, 152, 176
Integration with radio-----	32	34
Medical battalion-----	208	243
Reconnaissance company-----	182	220
Support company, airborne infantry regiment-----	158b	195
Telephone and teletype section, infantry division signal company-----	45c	48
Withdrawal, communication during. (See Retrograde movements.)		
Woods, combat-----	219	255

